ASUS P527 Level 3 4 Trouble shooting Guide

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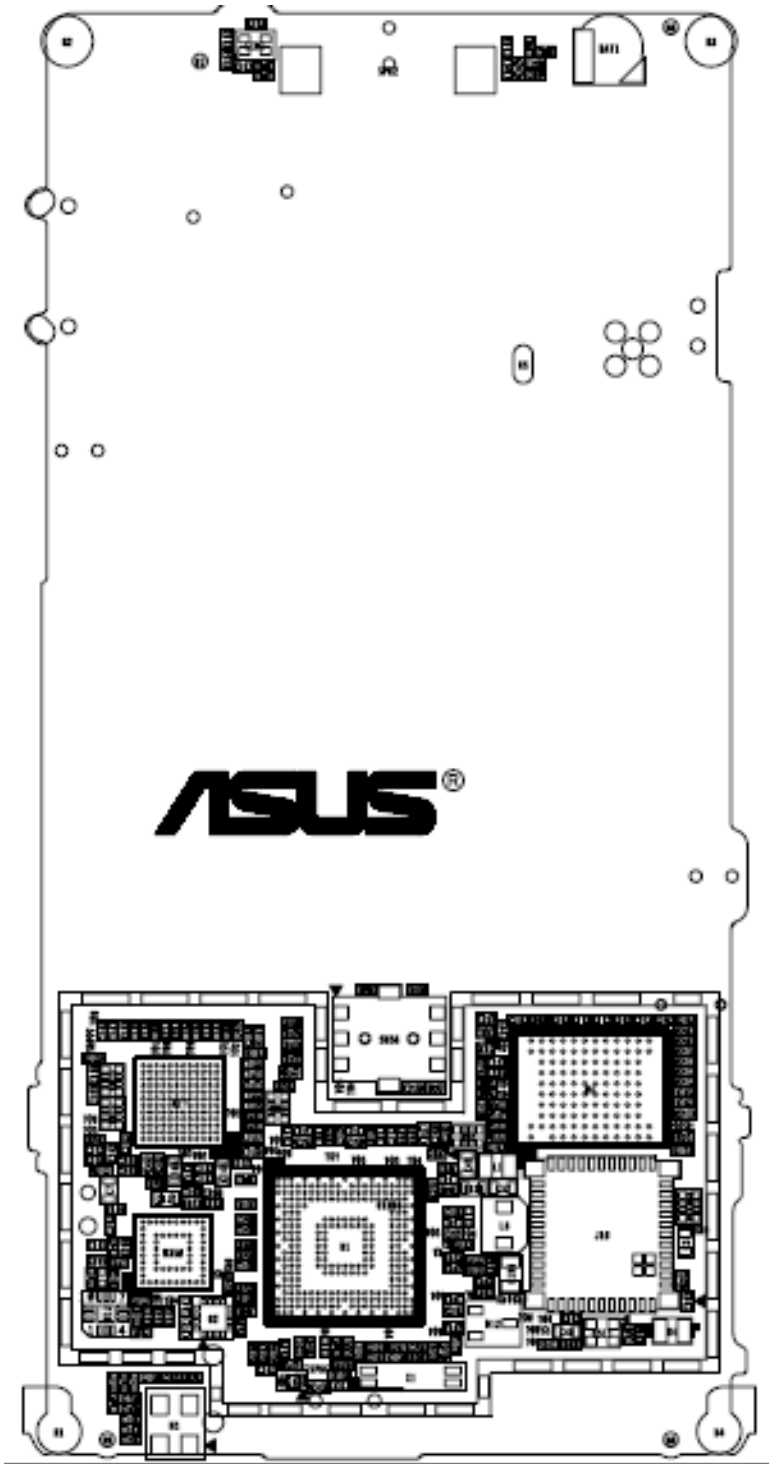
1. Feature Introduction

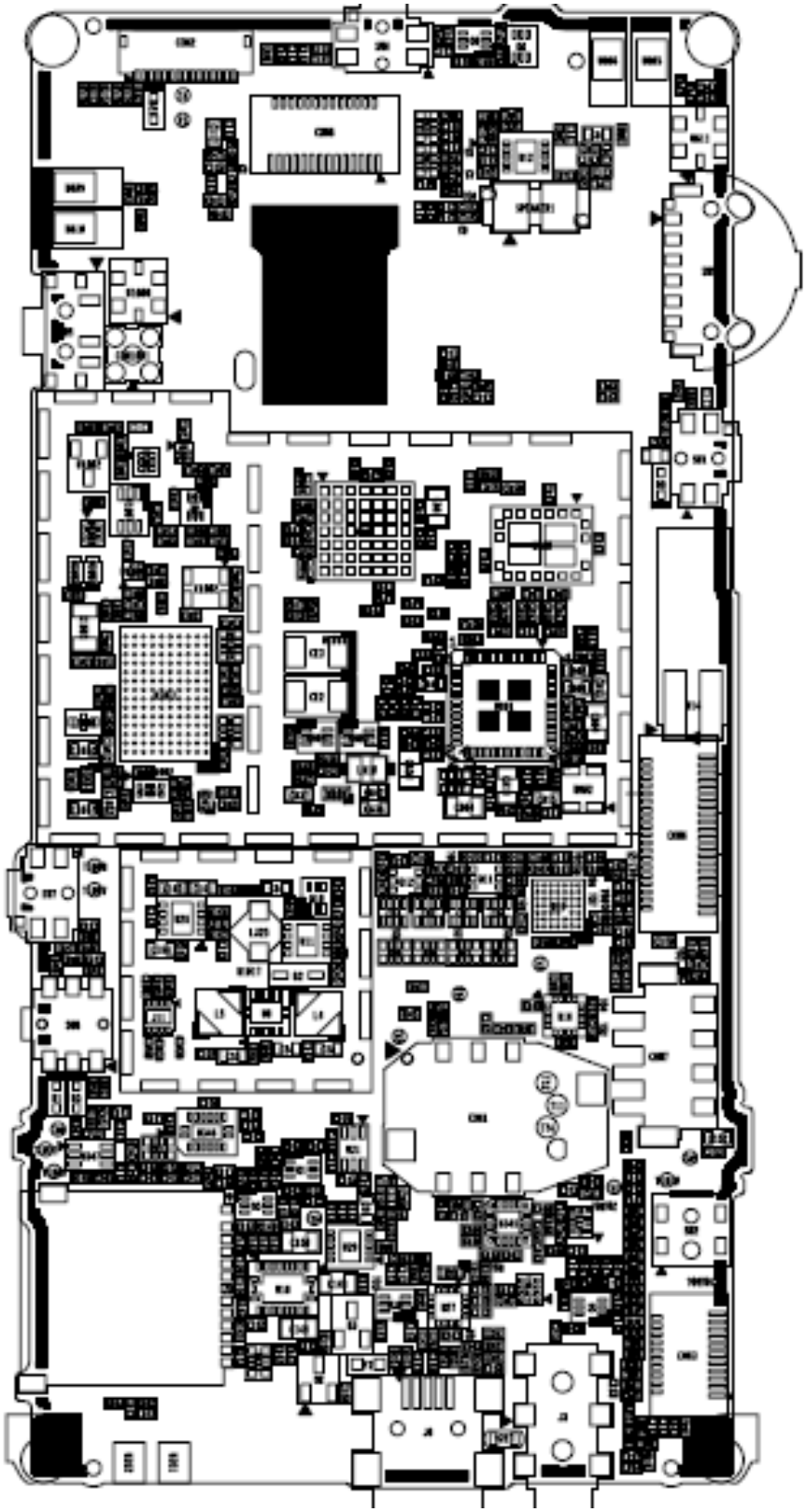
Networking system	EDGE/GPRS/GSM 850/900/1800/1900 EGPRS Class B, Multi-slot Class 10
Operating System	Microsoft Windows Mobile 6 Professional
CPU	TI OMAP 850 (200MHz)
Dimensions	113 x 58 x 15.4 mm, 125g
Battery	1300 mAh Lithium-Ion
Talk time	4-5 hour
Standby time	150-200 hours
Form Factor	Bar type with numeric keypad
Color	Dark Gray
Display	2.6“， 65K， TFT ， 240 x 320
Connectivity	WLAN 802.11 b+g / Bluetooth 2.0+EDR / FM / USB v1.1
Browsing	HTTP and WAP 1.2.1/2.0
Messaging	SMS/MMS/Email/MSN
Memory	128 MB Flash + 64 MB SDRAM
Expansion Slot	Micro-SD (SDHC supports)
GPS	GPS (SiRF III Solution with internal antenna)
JAVA	J2ME
Camera	2 Mega-Pixel (Auto focus)

2. P527 Placement OVER View

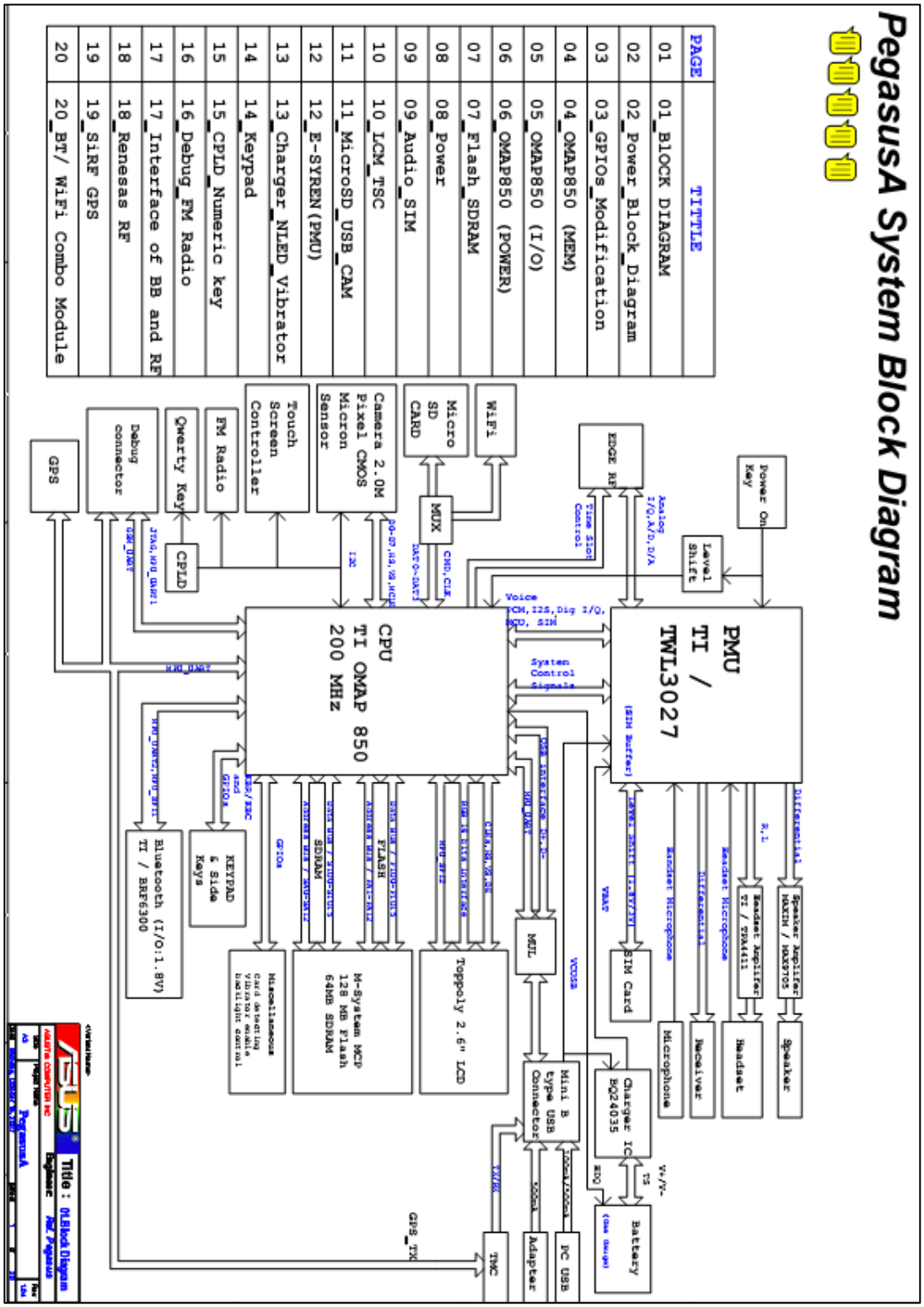
2.1 Top View



2.2 Bottom View



3. P527 SYSTEM Block Diagram

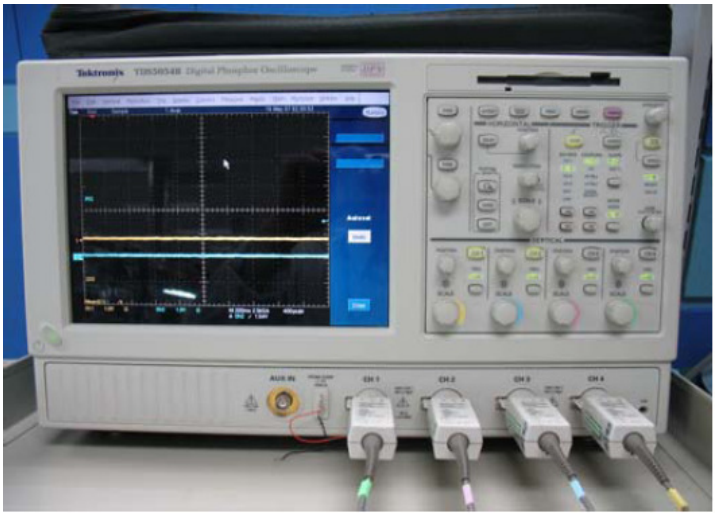


4. Equipment List

4.1 HW (Reference)

Power source: power supply (Monitor current)

Digital Phosphor Oscilloscope



Digital Meter

Mechanical Auxiliary Tool & tooling

- Screwdriver (T5 ＊ , Cross ＋)
- Tweezers
- Plastic Wrench

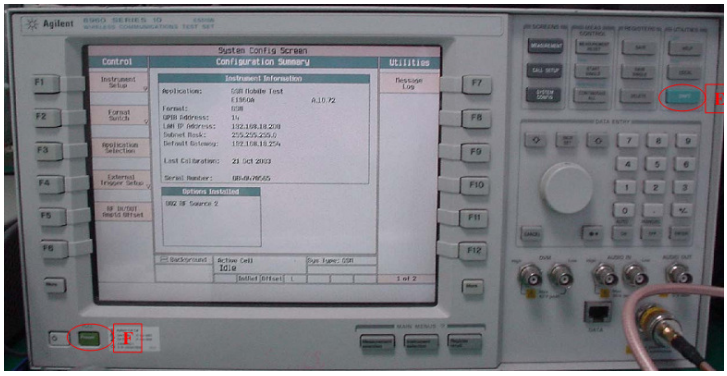
Micro SD

4.2 RF Repair equipment

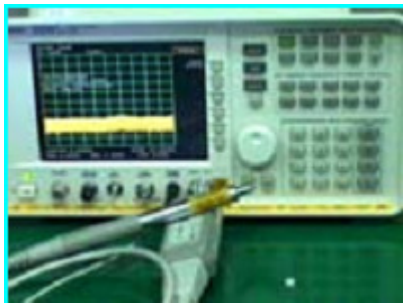
4.2.1 HW

GSM/WCDMA Tester

Agilent 8960 (link, test mode, or use as signal generator)



Spectrum analyzer



Data Cable

3.5mm earphone cable or jig for debug (sending command)

RF connector

(Murata MM126049 or cable as pic)
jig for connecting with 8960

4.2.1 SW

GSM / WCDMA

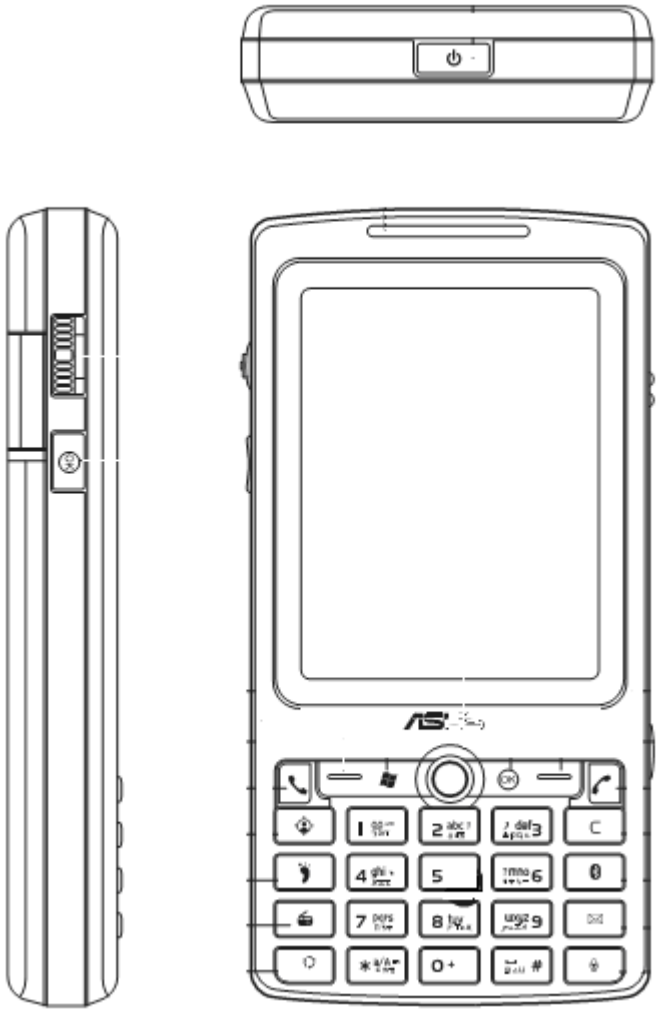
Auto Test Phone Tool
Modem Firmware：Latest Version
P527 RF TX/ RX debug tool

GPS

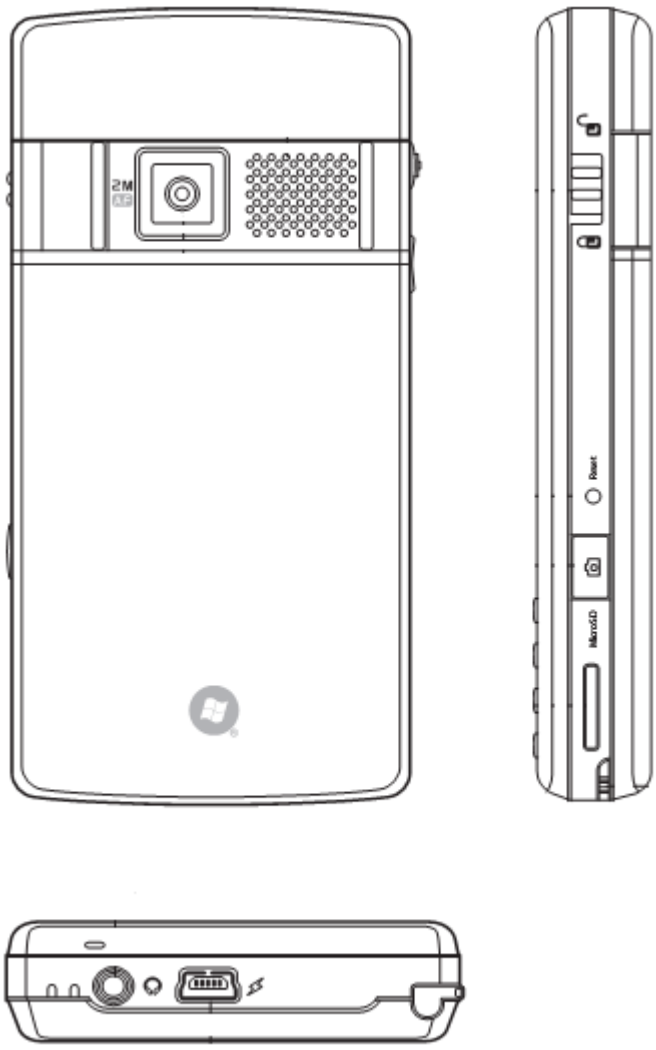
GPSDriverTool
SiRFDemoPPC
GPS Firmware: GSW3.2.4 or GSW Instant fix

5. Appearance

5.1 Front View



5.2 Bottom view



6. Features and key components introduction

System: PDA phone with Microsoft V6.0 Cross Bow OS

CPU: Ti OMAP850 (200 MHz)

PMIC: Ti TWL3027 (E-Syren) (Powers, RF codec, audio codec etc.)

Memory: M-System MCP25 (128MB flash + 64MB SDRAM (100MHz))

Bluetooth: Ti BRF6300 (ROM: V1.31, FW: V2.0.38)

WiFi: Ti WL1251

GPS: SiRF star III GSC3F

LCM: TFT LCD, 2.6”, 240x320 (QVGA), RGB (HS/VS) interface

USB: B type Mini USB V2.0 (V1.1)

Memory card: Micro SD (4 bits)

Camera: AF, 2M pixels (Micron MT9D111 chip with HS/VS)

Touch Screen Controller: Ti TSC2003

Status LED: 3 colors (Red, Green, Blue)

Numeral keys: 0, 1, 2, 3 …

Charger IC: Ti BQ24035

DC/DC: Ti TPS62401 for V_Core and VMEM_1V8

LDO: Maxim MAX8559 for Camera and Micro SD card.

Backlight control IC: Maxim MAX8595

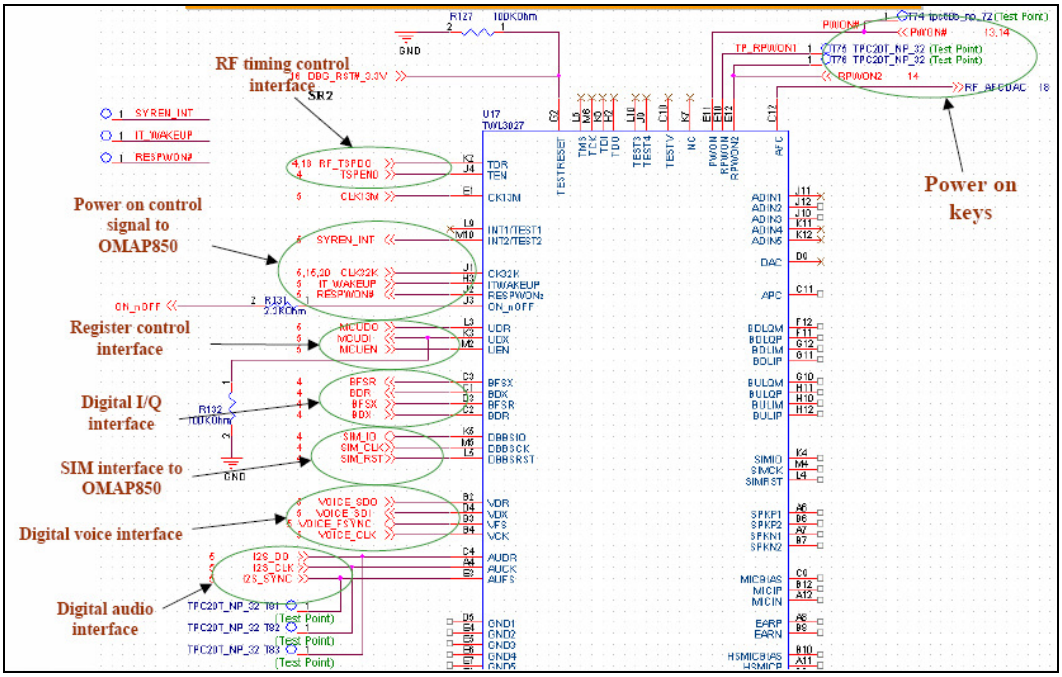
Speaker amplifier: Maxim MAX9700

Earphone amplifier: Maxim MAX9724B

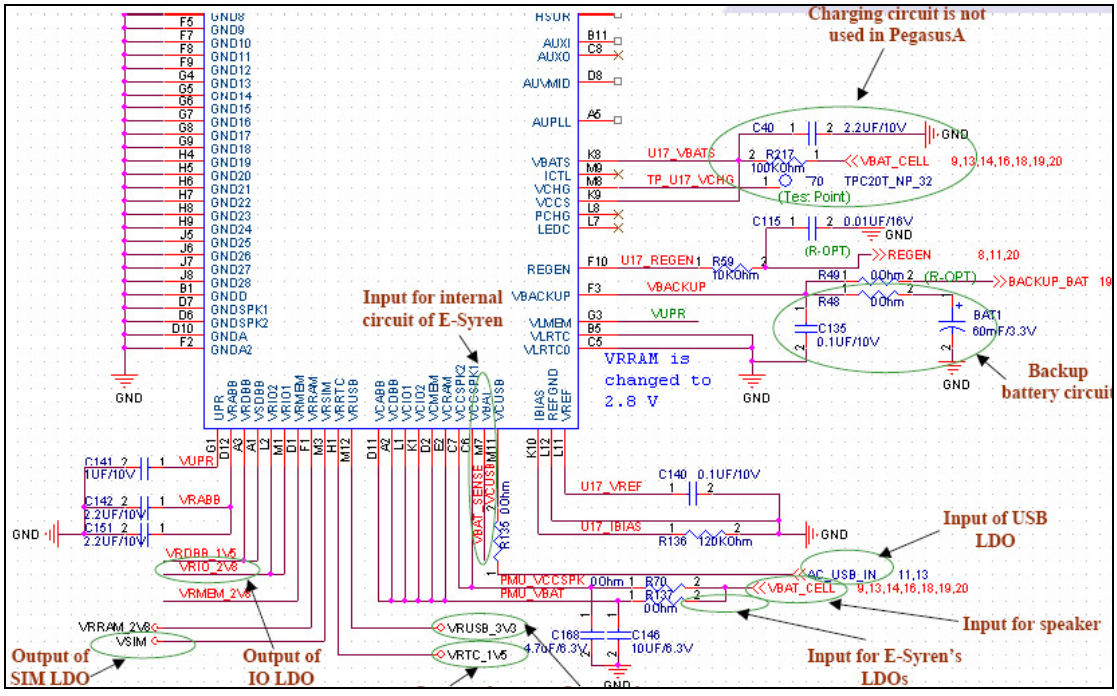
FM radio: Silicon Lab Si4703

7. Inter phase & Measure Point

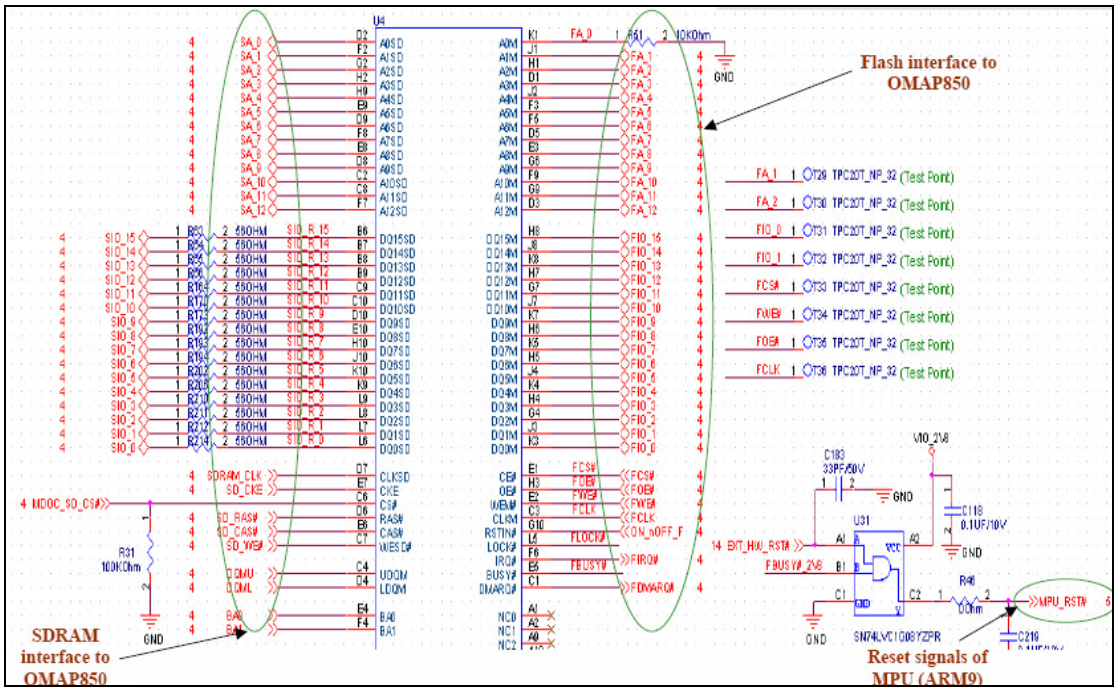
7.1 Power Unit IC



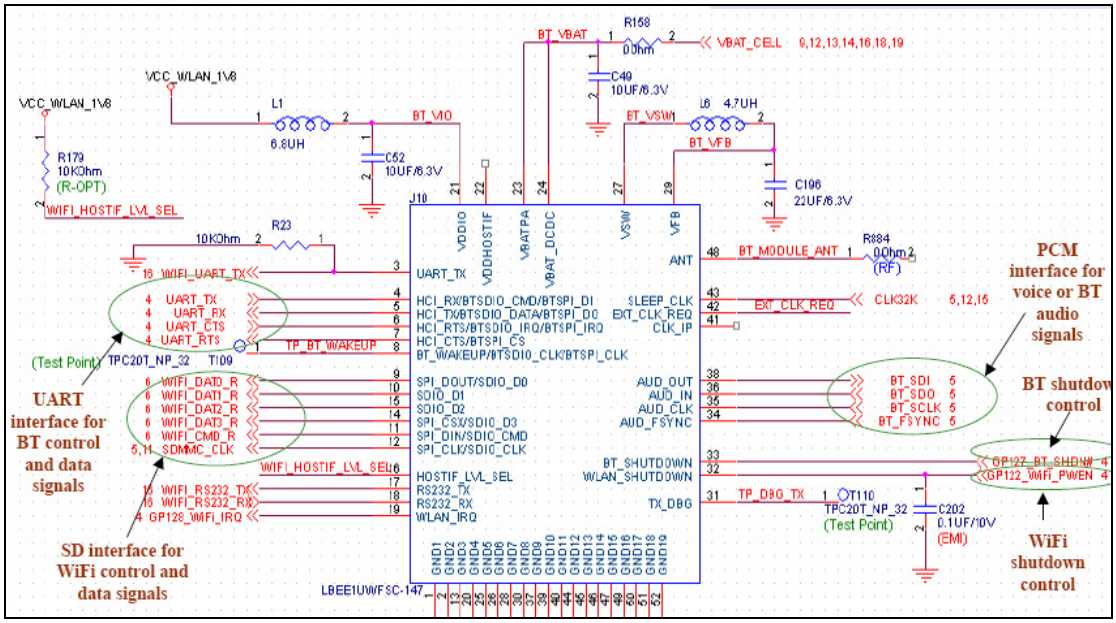
7.2 LDOs (E-Syren)


Charging circuit is not used in PegasusA
Input for internal circuit of E-Syren
VRRAM is changed to 2.8 V
Backup battery circuit
Input of USB LDO
Input for speaker
Input for E-Syren's LDOs
Output of SIM LDO
Output of IO LDO

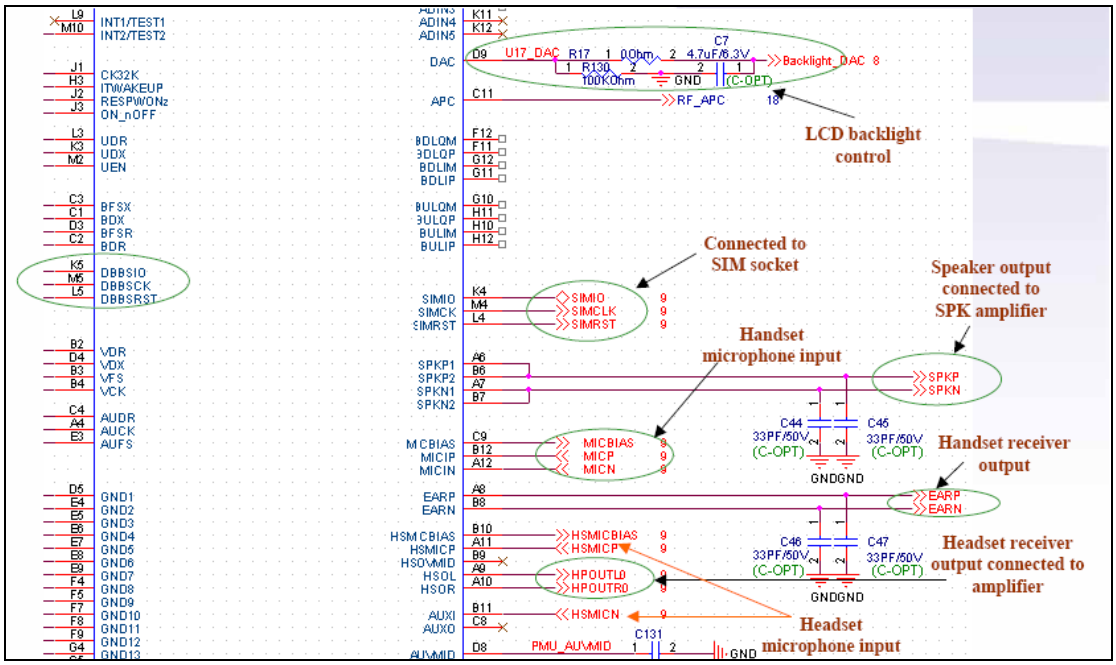
7.3 Memory



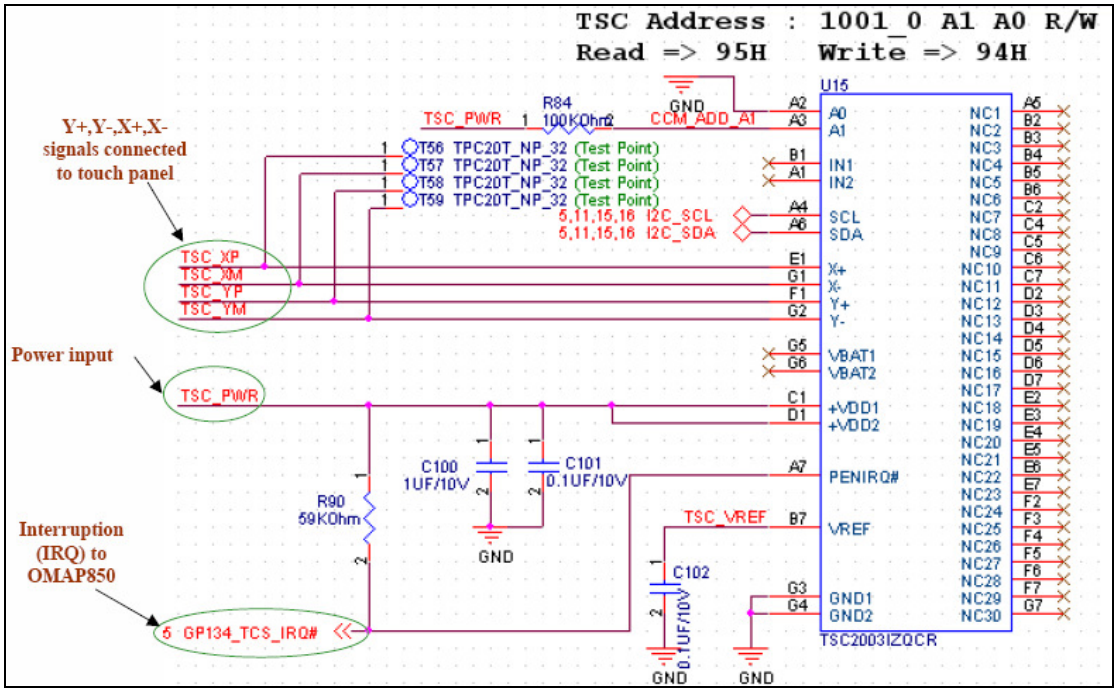
7.4 BT & WiFi


PCM interface for voice or BT audio signals
UART interface for BT control and data signals
SD interface for WiFi control and data signals
WiFi shutdown control

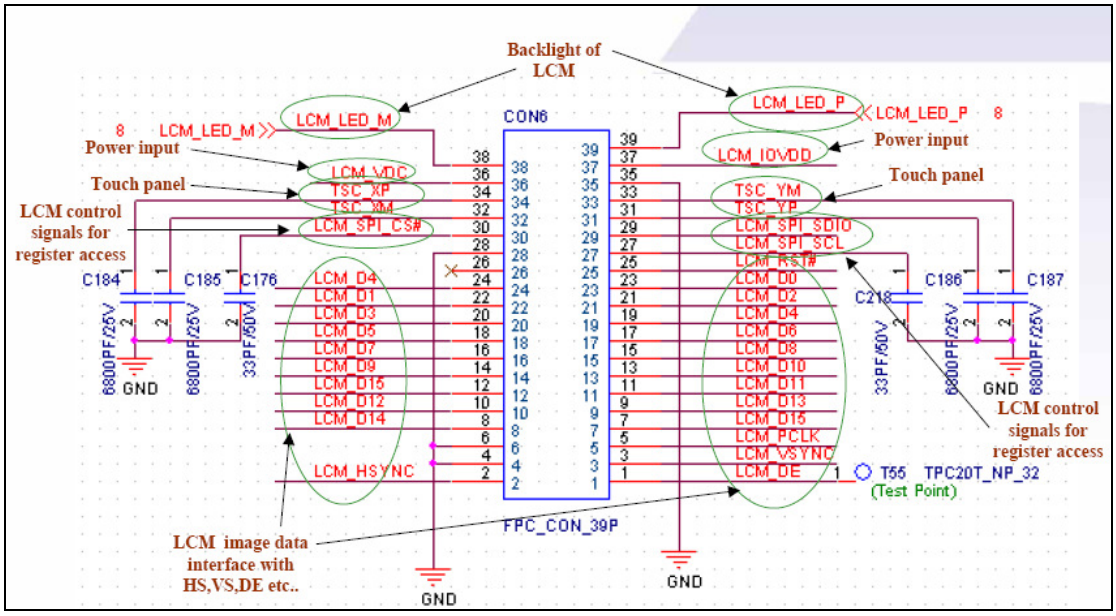
7.5 Audio & Power


LCD backlight control
Connected to SIM socket
Speaker output connected to SPK amplifier
Handset microphone input
Handset receiver output
Headset receiver output connected to amplifier
Headset microphone input

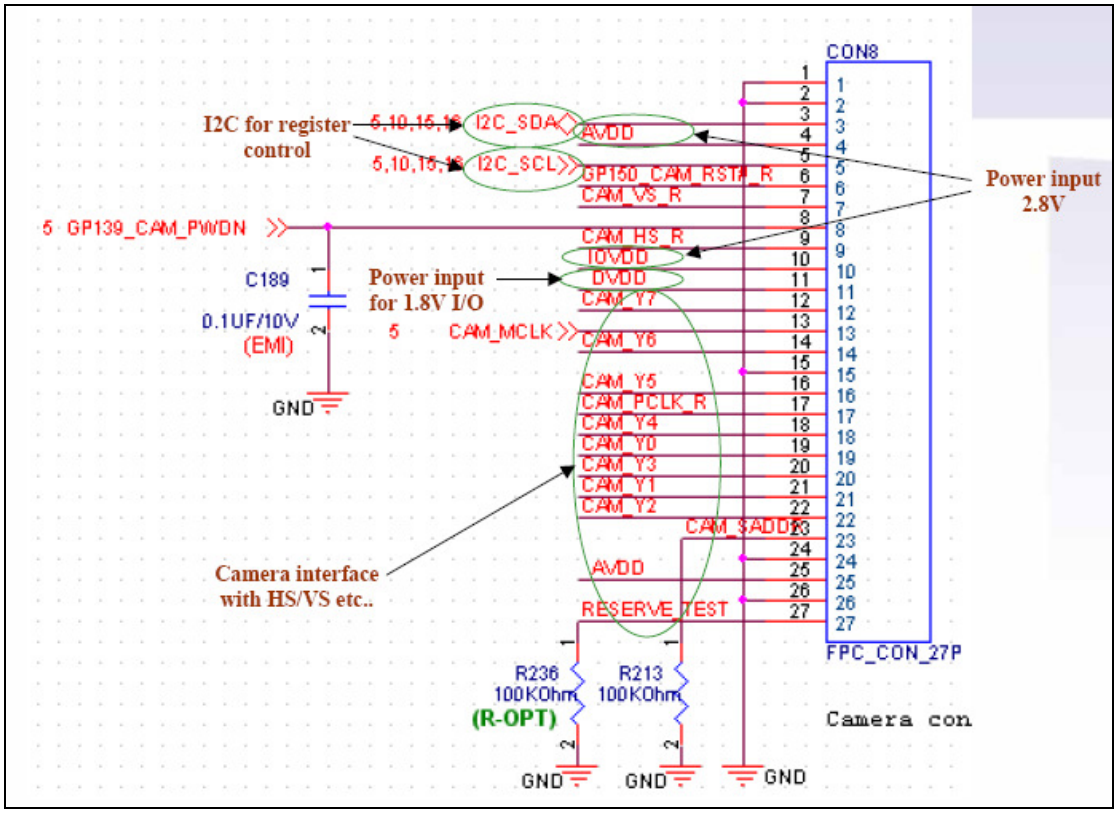
7.6 Touch Panel


TSC Address : 1001_0 A1 A0 R/W
Read => 95H Write => 94H
Y+,Y-,X+,X- signals connected to touch panel
Power input
Interruption (IRQ) to OMAP850
TSC2003IZQCR

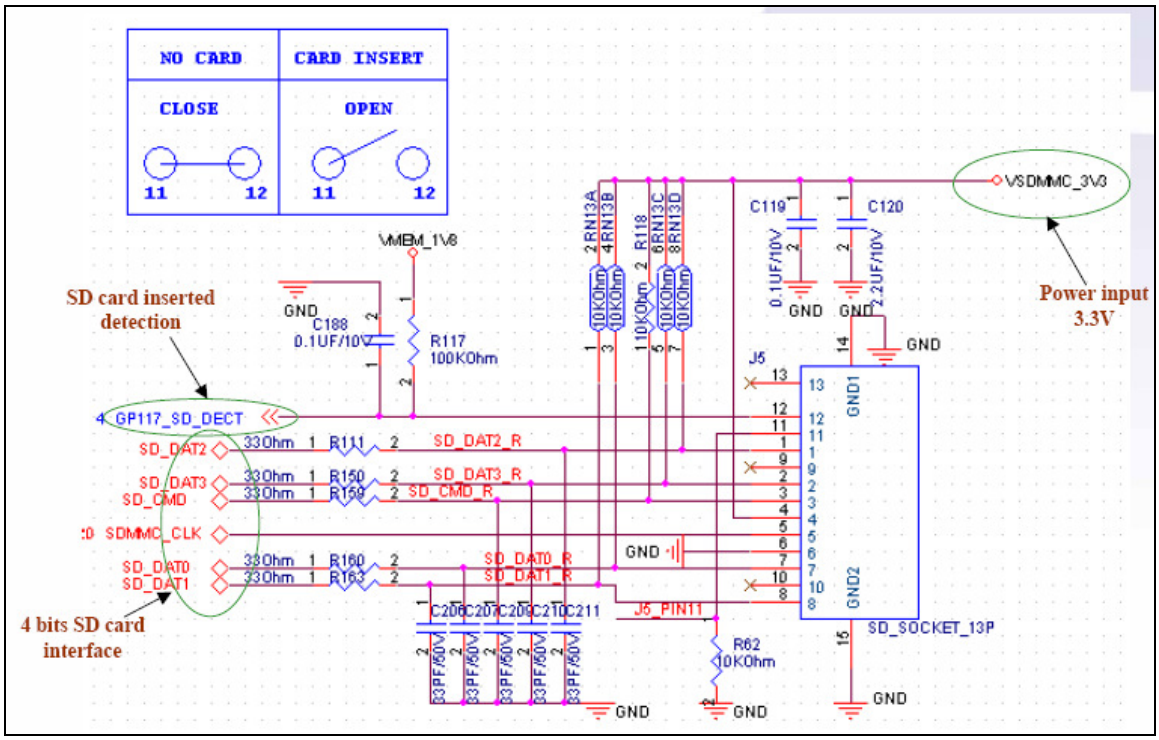
7.7 LCM



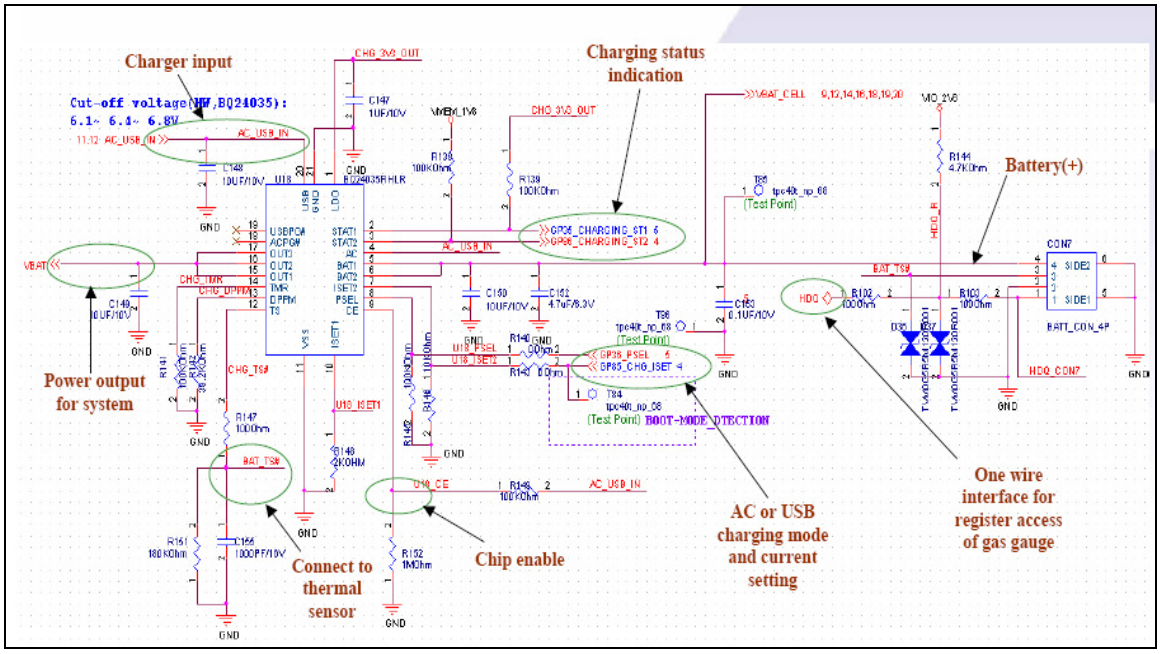
7.8 Camera



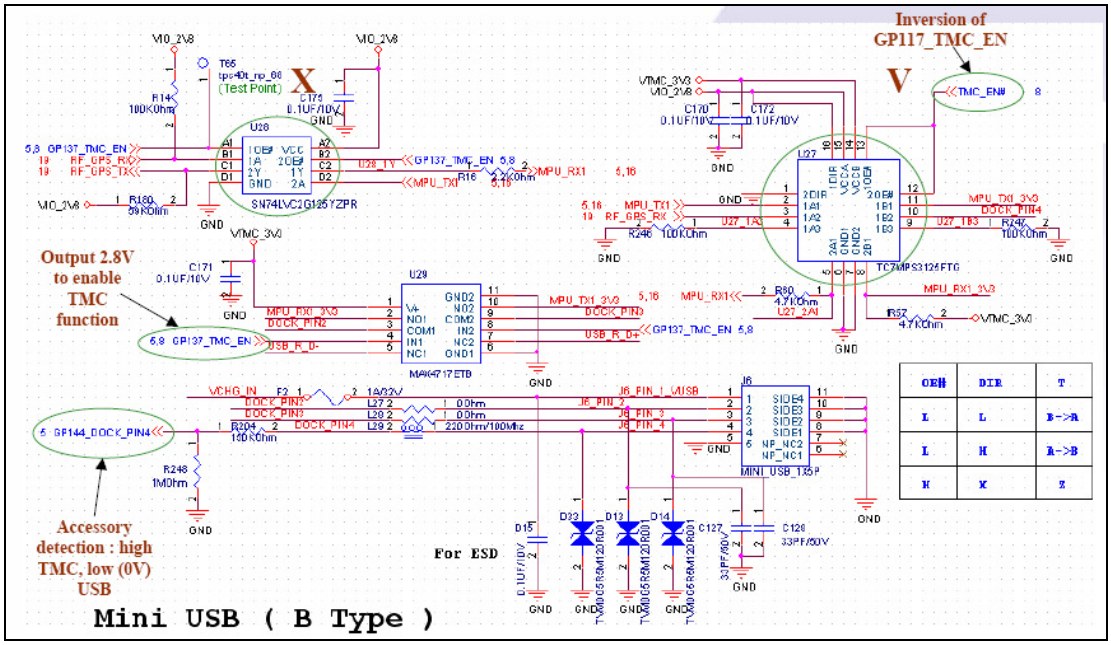
7.9 Micro SD



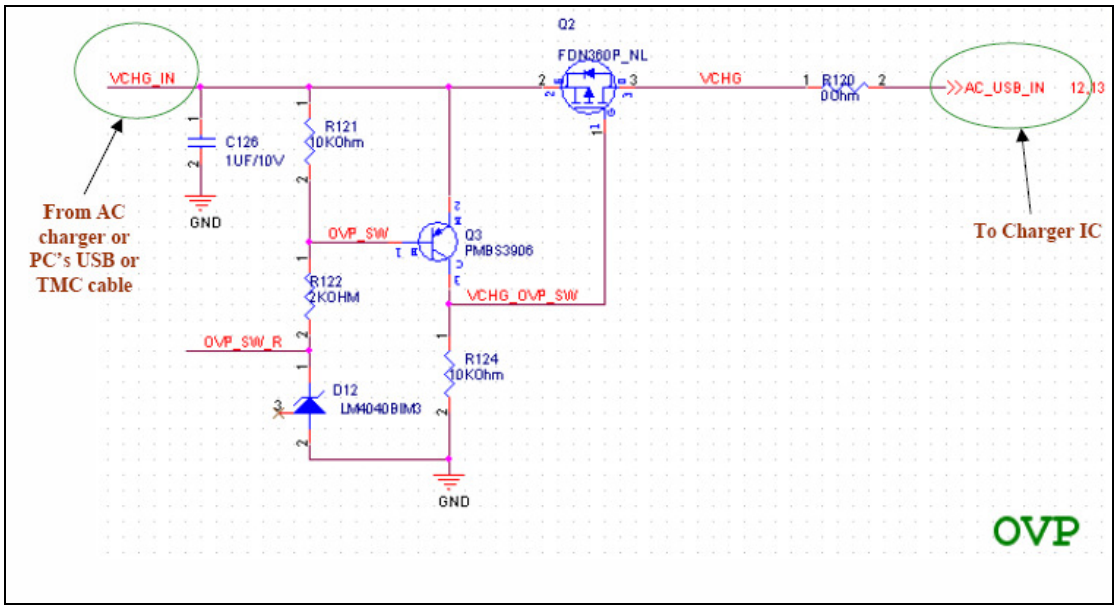
7.10 Charging IC



7.11 TMC

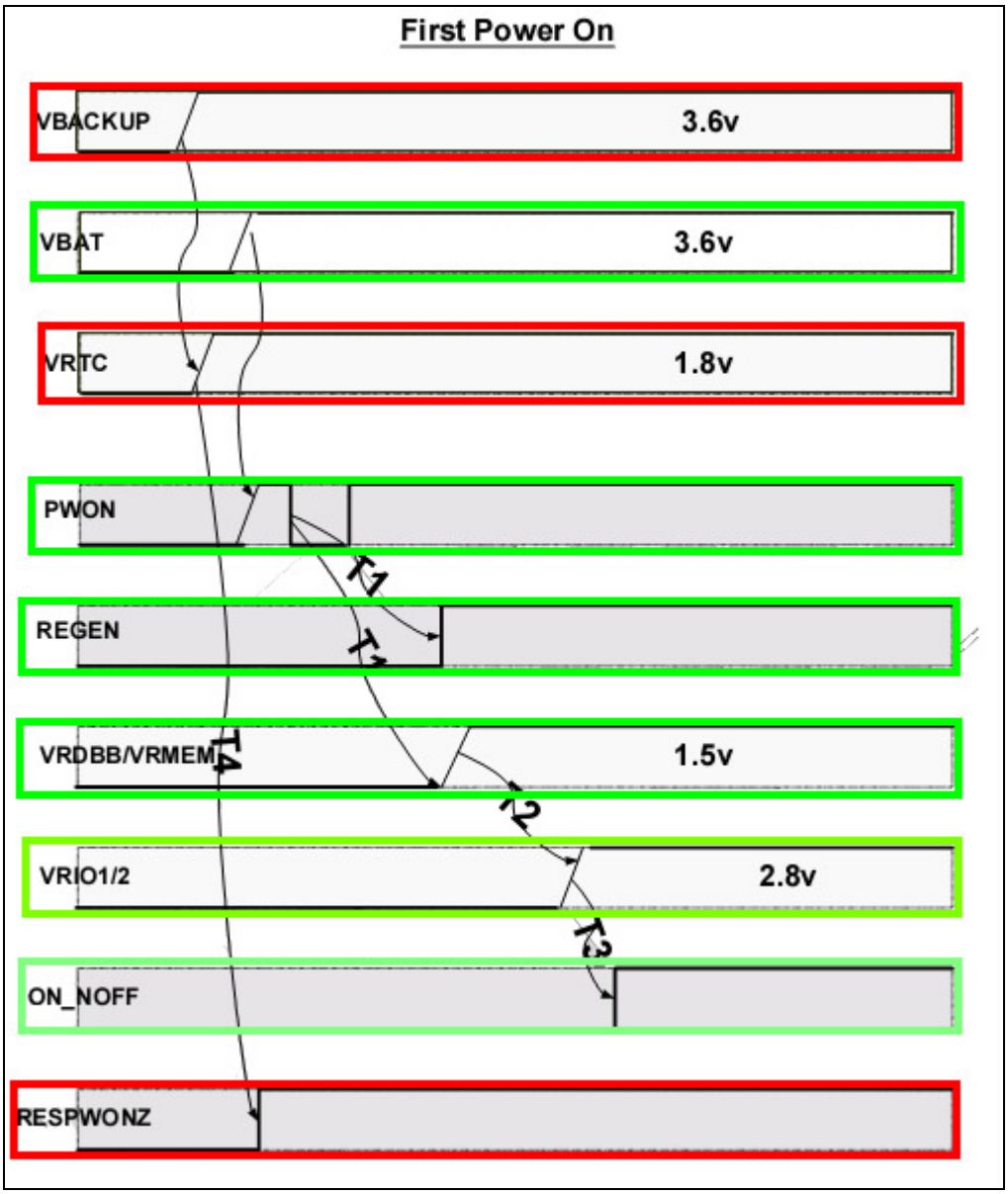


7.12 OVP (Over Voltage Protection)



8. Timing sequence

8.1 Boot up Sequence

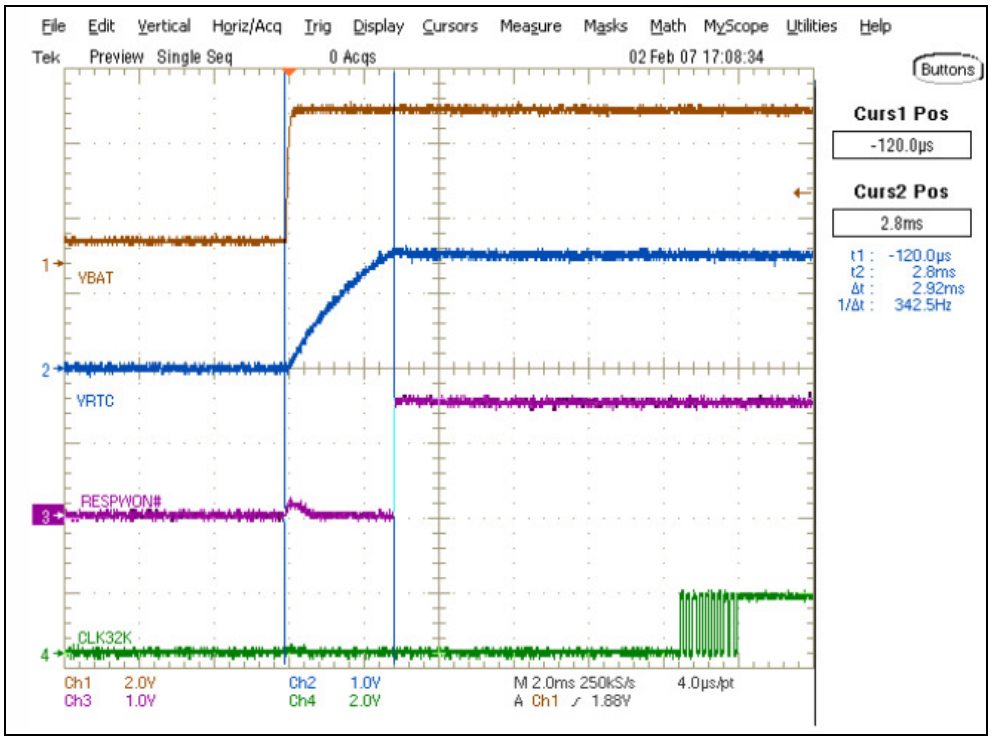


The Signal (3-second power-on key long press) will be detected by software and OS system will be shutdown if the pressed time is less 3 second.

Battery cover will be detected by software and system will be shutdown if the battery cover is removed.

PMU (E-Syren) will shutdown its power output if power-on key is pressed over 32 second.

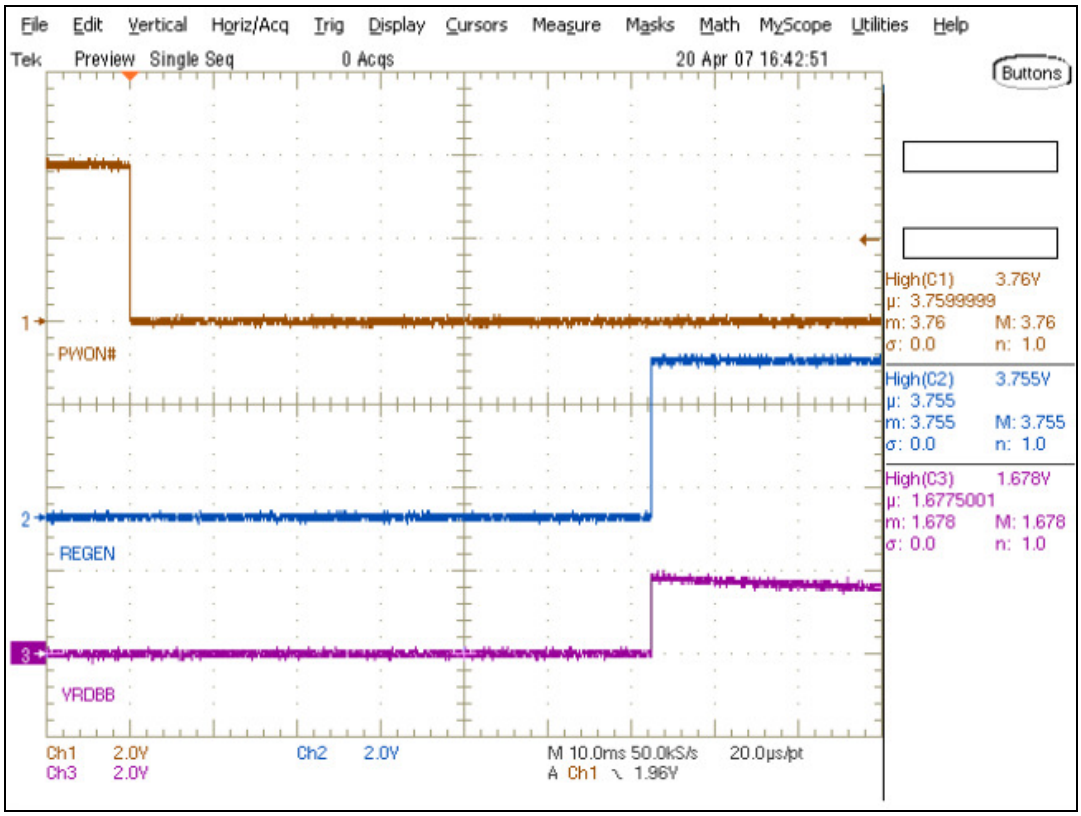
8.2 Path Red Signal

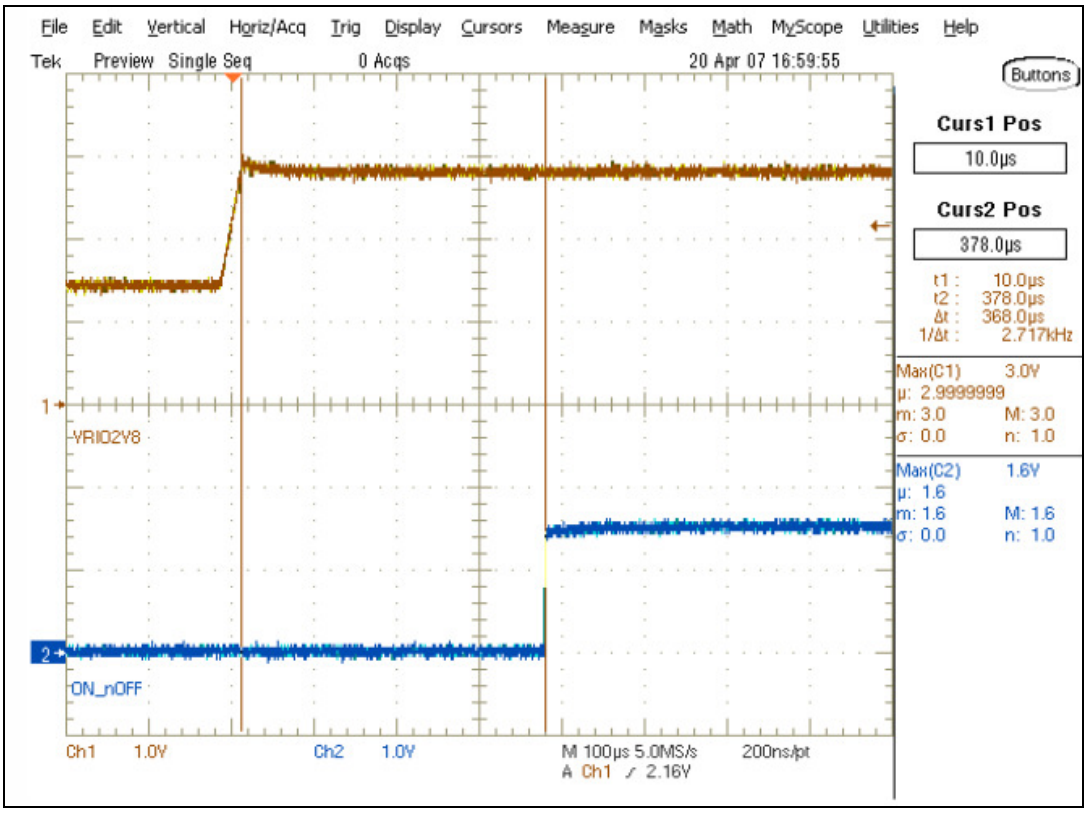


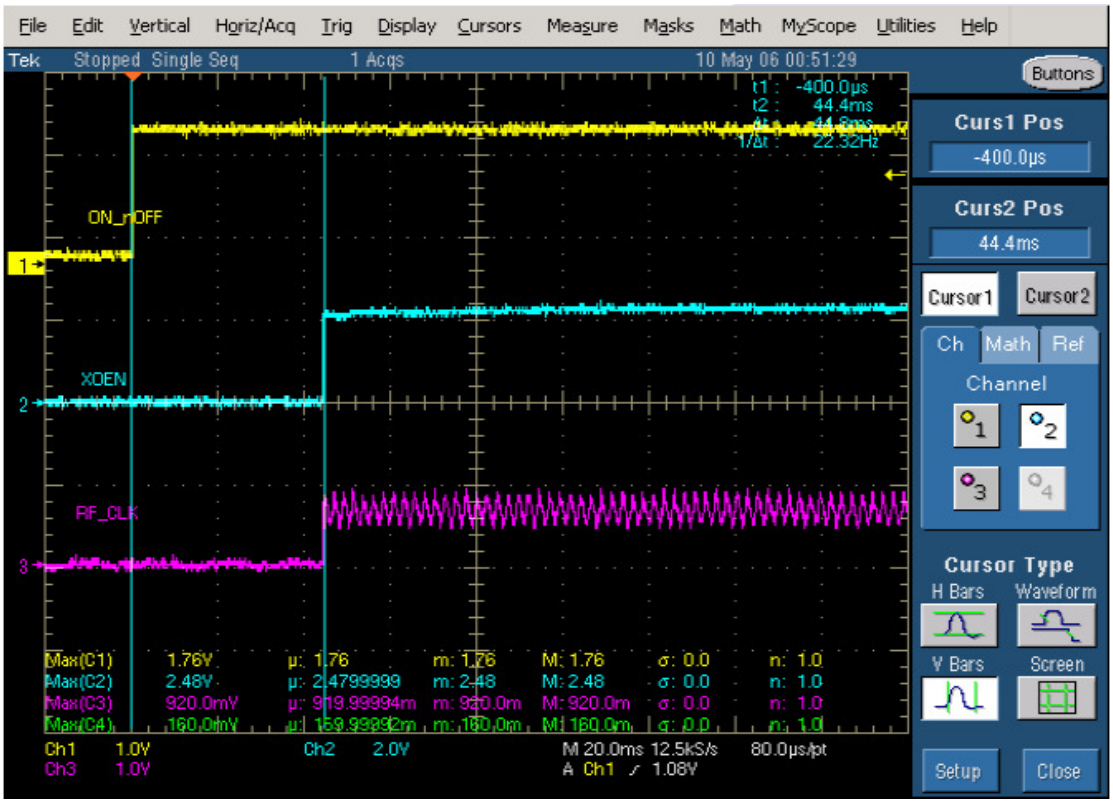
32K clock will appear after VBAT is powered.

Power-on sequence will start when after power-on key is pressed with 32 ms period de-bouncing .

8.3 Path Green Signal







Following procedures are recommended if system can not be powered up.
Check the stable current from DC power supply:

1. Large current (larger than 120mA) – Could be somewhere short.
2. Before pressing power-on key – check related with VBAT
   I. After pressing power-on key – check all DC/DC and LDOs
   II. No current (E-Syren is not powered on) – check power-on key, 32Kclock
3. 1x mA – OMAP850 does not start up (could be 26MHZ NG or MPU_RST# NG)
4. 2x mA – Could be flash issue.
5. 6x mA – Could be SDRAM issue.

9. System can’t power on:

In order to find out can’t power on issue, first step is to check current consumption. You can observe PCBA to make sure if there is any component short or open on PCBA board. After that, you can choose proper ways to solve problem. You can refer to below items.

1. The current occurred before pressing power on key. It terms of this, the current value is under 10uA when battery voltage is powered and power on key does not be press.

Please check either traces which are relevant to battery voltage have short circuit problems such as RF-VBAT, VBAT and VBAT_CELL like that or other components have short circuit problems.

Followings are special cases occurred before for reference.

A. U808 has powered on itself due to shutdown pin damaged.

B. Auto power on phenomenon occurred because signals of traces PWOW# or signals of RPWRON# are pulled low. Please check related traces of PWOW# and RPWRON#.

2. Here comes out possible reasons through analyzing current values when current after pressing power on key keeps steady values.

In normal cases, current values are supposed to be variable during the system is under operating process.

9.1 Current value > 120mA:

It may caused by short circuit in somewhere such as short circuit in DC/DC converter or LDOs output.

Please check voltage

VCORE_1V6

VMEM_1V8

VIO_2V8

VCAM_2V85

9.2 Current value >1mA:

The system may not be powered on. Please check below signals.

1. PWON# signal – the value of PWON# is supposed to be low, 0V, when power on key is pressed.
2. VRTC_1V5 (R30) – Please check if the value is 1.5V.
3. X1- Please check if there is 32 KHz signal.
4. If there is open from PMU_VBAT (R137).

9.3 Current value 10mA ~ 20mA

Power on sequence may be no problem but OMAP850 (U1) does not work. Please check below signals.

1. ON_nOFF (R131) signal is supposed to be high, 1.5V.
2. XOEN (R865) signal is supposed to be high, 2.8V.
3. The dual output voltage of U808 is supposed to be 2.8V respectively, L810 and R867 and R868.
4. 26MHz should have output signal (R815).
5. MPU_RST# is supposed to be High 2.8V (R46).

9.4 Current value 20mA ~30mA

Current value 20mA ~30mA Flash memory may hang up.

There are many signals of flash. Meanwhile, OMAP850 and M-System are both BGA package.

Above situations may increase the difficulty of signal measurement. Here we only list some test points to measure and test signal quality. The test points as below.

A. T29 –> FA_1

B. T30 –> FA_2

C. T31 –> FIO_0

D. T32 –> FIO_1

E. T33 –> FCS#

F. T34 –> FWE#

G. T35 –> FOE#

H. T36 –> FCLK

Above signals are 1.8V power domains. It means the voltage value is 1.8V.

9.5 Current value 50mA ~ 70mA

Possible reason of this case is because the SDRAM S/W program hangs up. Due to too many SDRAM signals, OMAP850 and M-System are BGA package. Both above situations may increase the difficulty of signal measurement.

Here we only list some test points to measure and test signal quality.

We can re-download S/W program if we suspect S/W program has problem.

A. T23 –> SA_0

B. T24 –> SD_WE#

C. T25 –> DQML

D. T26 –> BA0

E. T27 –> SD_RAS#

F. T28 –> SD_CAS#

10. P527 MMI test items

10.1 Board level:

Note: test items marked with Green are tested automatically.

1. Audio test (including Headset, Handset and speaker)
2. Button/Keypad test
3. BT Test mode (Auto) (UART interface only)
4. Storage test (Auto)
5. Display test (including backlight adjustment)
6. LED test (Auto) (Red, Green, Blue)
7. Vibrator test (Auto)
8. Micro-SD test (Auto)
9. SDRAM test (Auto)
10. RTC test (Auto)
11. Version check (Auto)
12. Turn On/Off Radio (Auto)
13. Reset Button

10.2 System level:

Note: test items marked with brown are added and not tested in board level

1. Touch panel calibration (since LCM is different from board level one)
2. Audio test (including Headset, Handset and speaker)
3. Battery test (Auto)
4. Button/Keypad test
5. BT Test mode (Auto) (UART interface only)
6. Camera test

7. Storage test (Auto)
8. Display test (including backlight adjustment)
9. LED test (Auto) (Red, Green, Blue)
10. Vibrator test (Auto)
11. Micro-SD test (Auto)
12. SDRAM test (Auto)
13. RTC test (Auto)
14. Version check (Auto)
15. Check SIM (Auto)
16. Turn On/Off Radio (Auto)
17. TMC test (Auto)
18. Reset Button

11.MMI illustration

11.1 Audio test

Audio test (including Headset, Handset and speaker)

The main purpose of this test item is to test the function of voice and audio can be operated normally. It terms of this, functions of microphone, receiver and speaker can be operated normally.

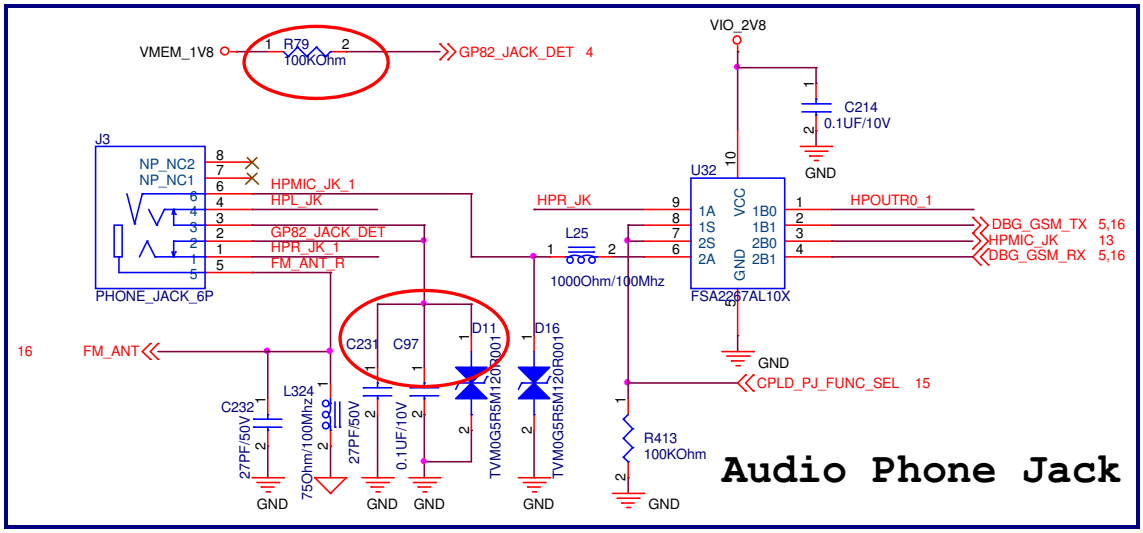
Test procedures are as below.

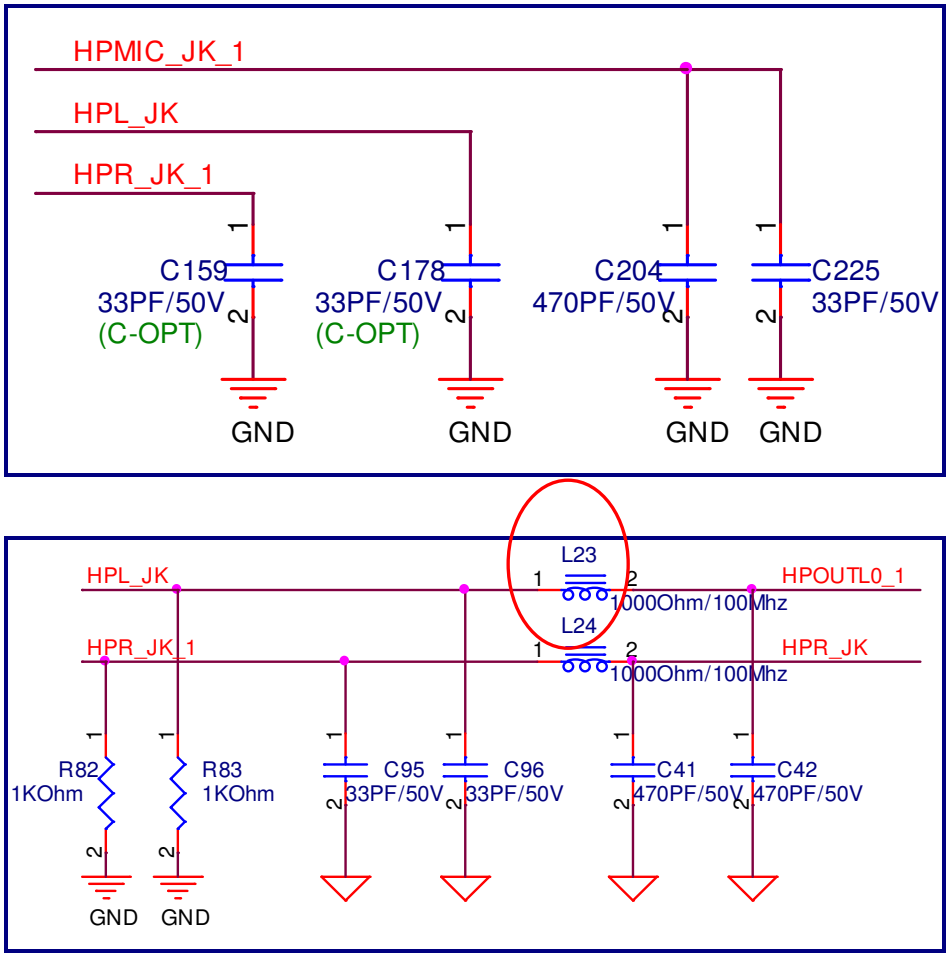
11.1.1.

The first step is to plug in headset. Please check below signals if test result is NG when you plug in headset.

a. Please make sure the signal of GP82_JACK_DET (pin no. 2 of R79) is high, 1.8V. Please check if there is short circuit located in J3 area if the value is not 1.8V such as 79, C231, C97, and D11 etc.

a.





11.1.2

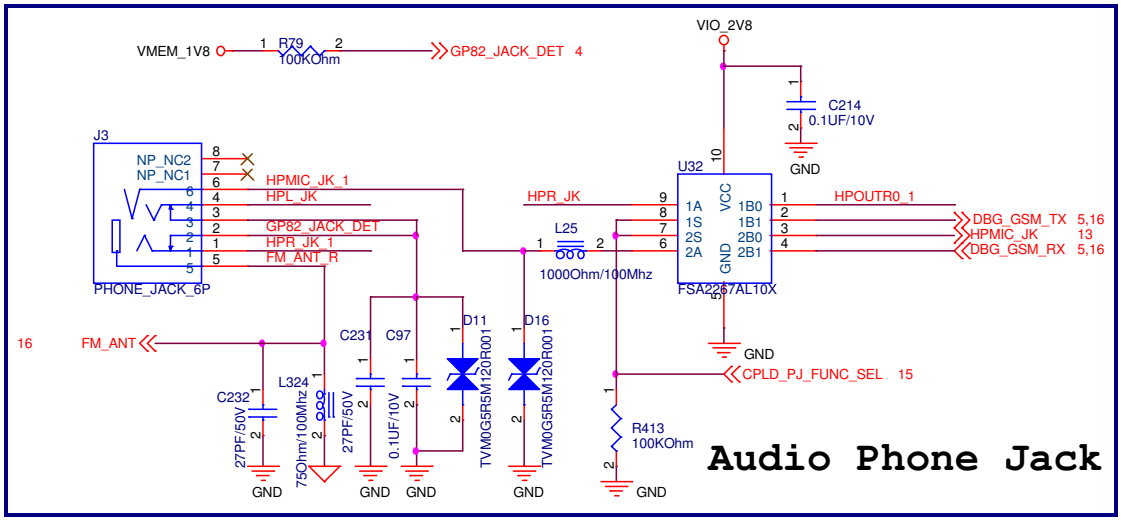
Play music by using left voice channel and right voice channel.

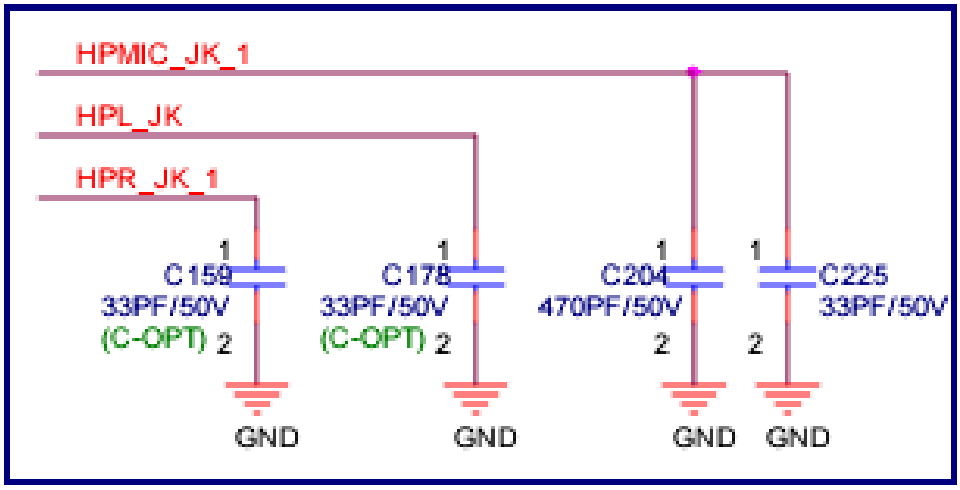
Please check below signals if the sound is NG.

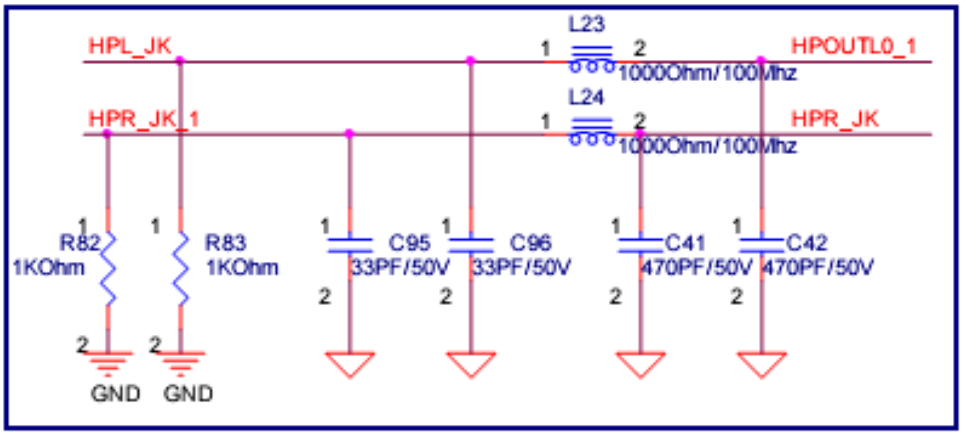
Left voice channel NG

Please measure signal of audio amplifier if L23 has no voice signals. Please check related components and signals of audio amplifier such as R83, C178, C74, C75

and C76 if there is no output located in handset amplifier U13. The values of both L7 and GP16_JACK_AMP_SHDN# (R39) are supposed to be 2.8V.


VMEM_1V8
R79
100KOhm
GP82_JACK_DET 4
VIO_2V8
C214
0.1UF/10V
GND
J3
NP_NC2
NP_NC1
HPMIC_JK_1
HPL_JK
GP82_JACK_DET
HPR_JK_1
FM_ANT_R
PHONE_JACK_6P
HPR_JK
L25
1000Ohm/100Mhz
U32
VCC
GND
1A
1S
2S
2A
1B0
1B1
2B0
2B1
FSA2267AL10X
HPOUTR0_1
DBG_GSM_TX 5,16
HPMIC_JK 13
DBG_GSM_RX 5,16
16
FM_ANT
C231
C97
D11
D16
C232
L324
27PF/50V
75Ohm/100Mhz
0.1UF/10V
TVM0G5R5M120R001
CPLD_PJ_FUNC_SEL 15
R413
100KOhm
Audio Phone Jack


HPMIC_JK_1
HPL_JK
HPR_JK_1
C159
33PF/50V
(C-OPT)
C178
33PF/50V
(C-OPT)
C204
470PF/50V
C225
33PF/50V
GND


HPL_JK
HPR_JK_1
L23
L24
1000Ohm/100Mhz
HPOUTL0_1
HPR_JK
R82
1KOhm
R83
1KOhm
C95
33PF/50V
C96
33PF/50V
C41
470PF/50V
C42
470PF/50V
GND

11.1.3

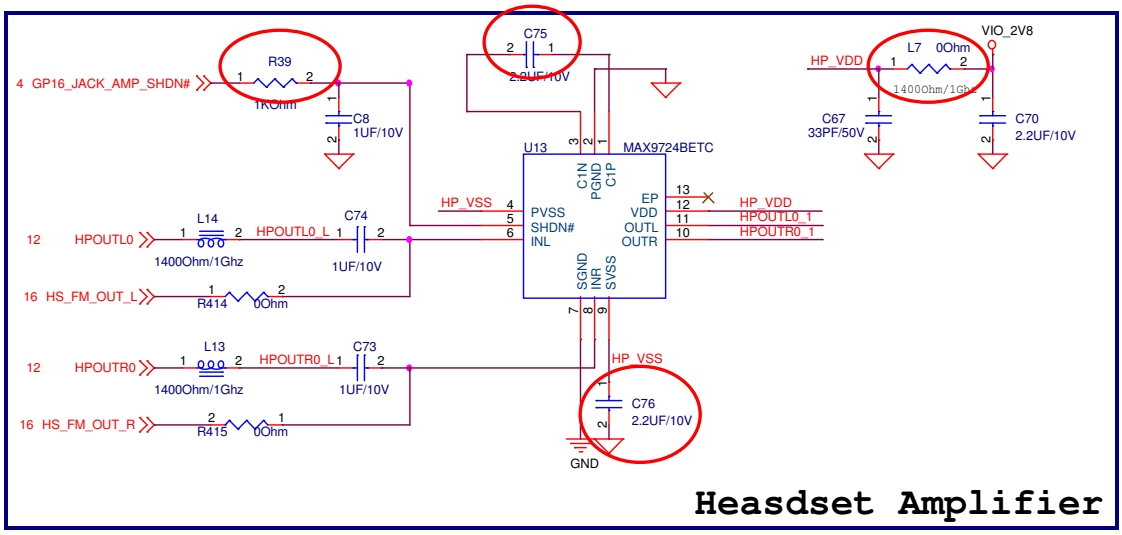
Play music by using left voice channel and right voice channel.

Please check below signals if the sound is NG.

Left voice channel NG

Please measure signal of audio amplifier if L23 has no voice signals. Please check related components and signals of audio amplifier such as R83, C178, C74, C75

and C76 if there is no output located in handset amplifier U13. The values of both L7 and GP16_JACK_AMP_SHDN# (R39) are supposed to be 2.8V.



Right voice channel NG

Measure ways are similar with left voice channel NG but measuring components are change to L24 and U32.

It means U32 switch can't switch normally if there is no voice signal from L24. In means CPLD_PJ_FUNC_SEL is supposed to be low (pin#1 of R413) or U32 SMT has problem. To avoid this, we can heat U32.

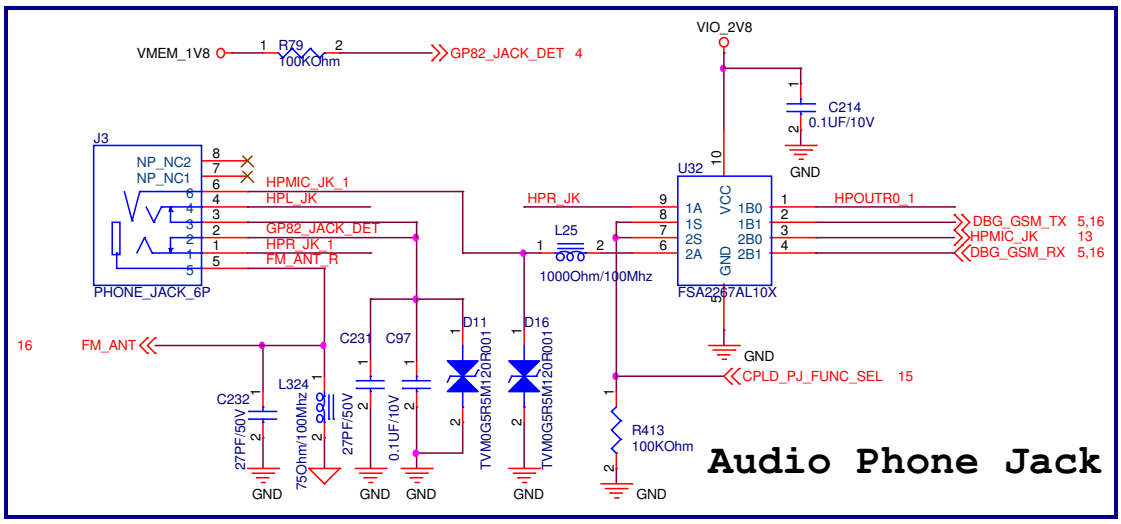
11.1.4

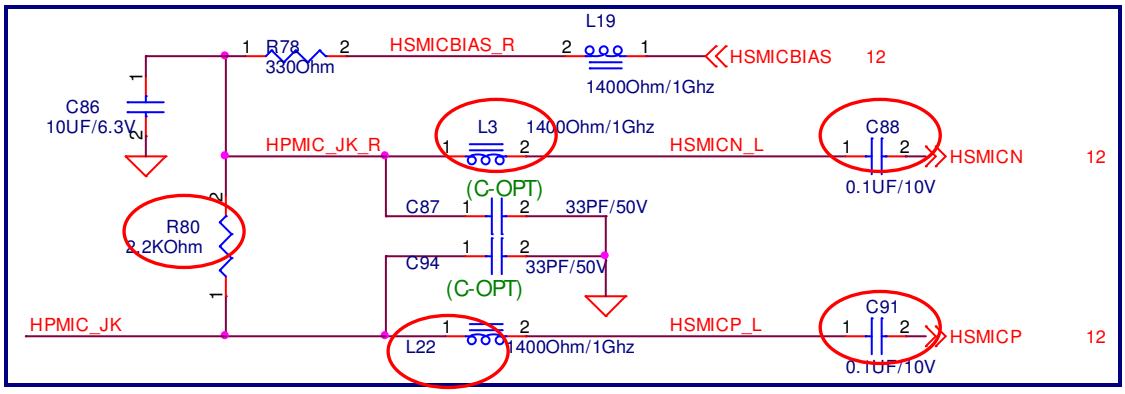
Headset recording test. Please check below signals if the test result is NG.

a. Please make sure the output of R18 is 2.8V and check related components such as R80, L3, C88, L22, C91, and C204 etc.

b. If HSMICN and HSMICP does not have normal voice signal when we answer the phone by using headset.

c. E-Syren, the SMD of U17 or U17 component have problem if we can't hear recorded voice when HSMICN and HSMICP have signals.





11.1.5

Unplug headset audio test

Test procedure is same as headset test but the value of GP82_JACK_DET is supposed to be Low (0V)

11.1.6

Play some music from speaker test. Please check below signals if the result is NG.

a. L9 and L11 should have PWM signals and signal voltage level is VBAT.

b. Make sure L8 voltage is same as VBAT.

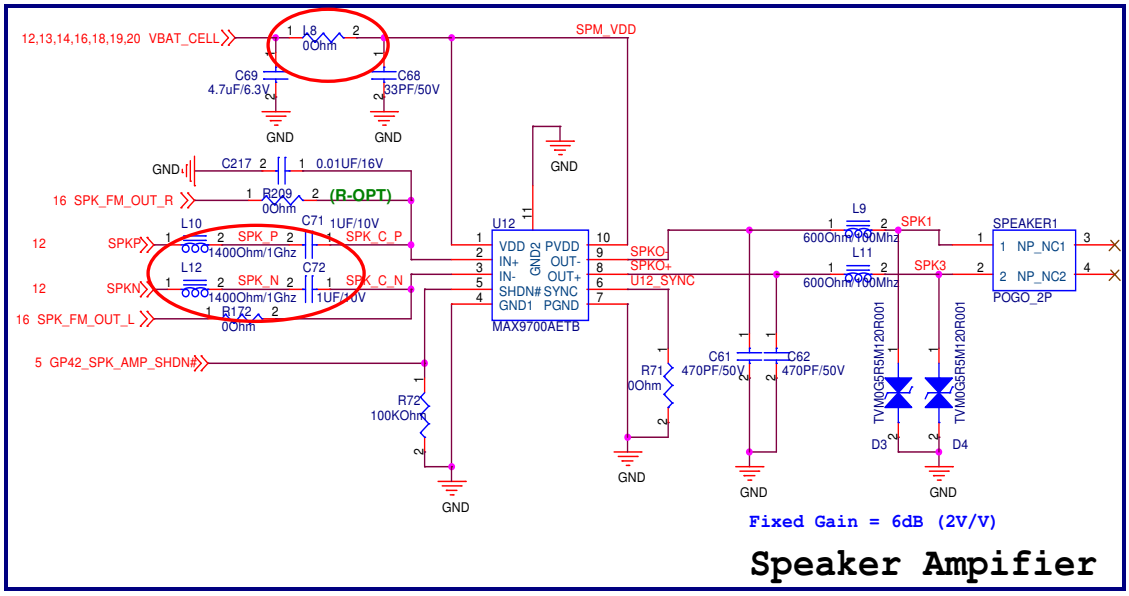
c. The value of GP42_SPK_AMP_SHDN# (Pin#1 of R72)

d. should be High (2.8V).

e. L10, C71, L12, and C72 should have audio analog signal. It

f. implies U17 (E-Syren) may have problem if there is no

g. audio signals.



11.1.7

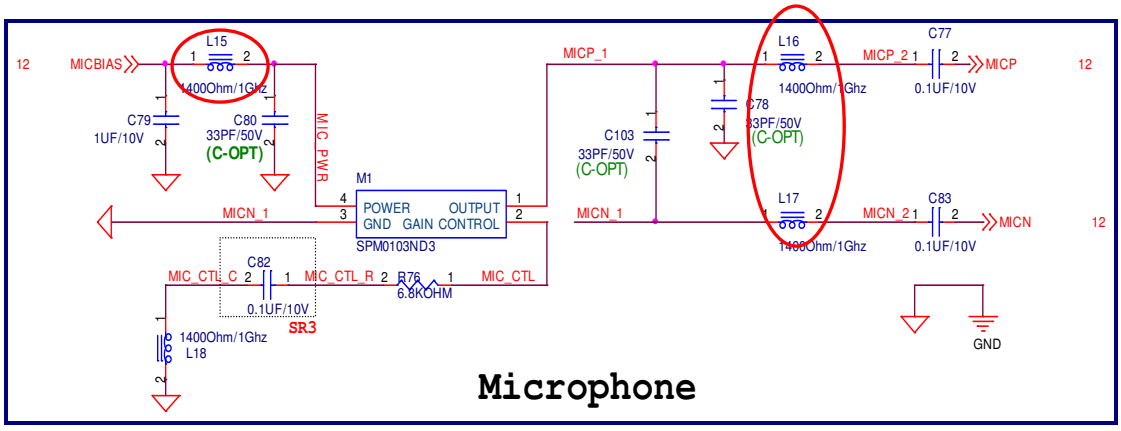
Record some voice and play it to speaker. Please check below signals if the result is NG when we record voices from microphone and play to speaker.

a. L15 should has microphone Bias, around 2.1V.

b. L16 and C77 are supposed to have voice signals provided voices were input.

c. Please make sure there is no connection problem for following components, L17,

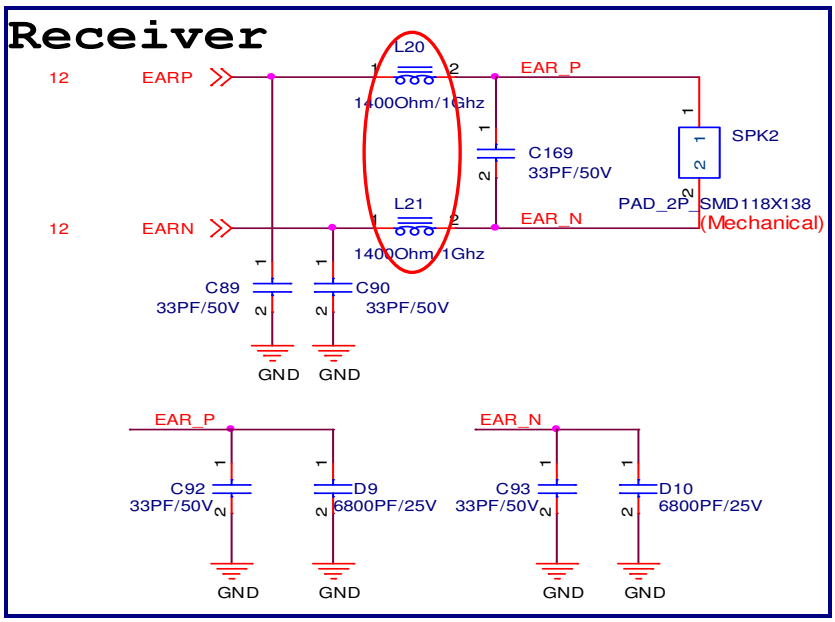
C83, R76, C82, and L18.



11.1.8

Headphone (Handset) receiver test. Please check below signals if the test result is NG.

a. L20 and L2 are supposed to have voice signals.

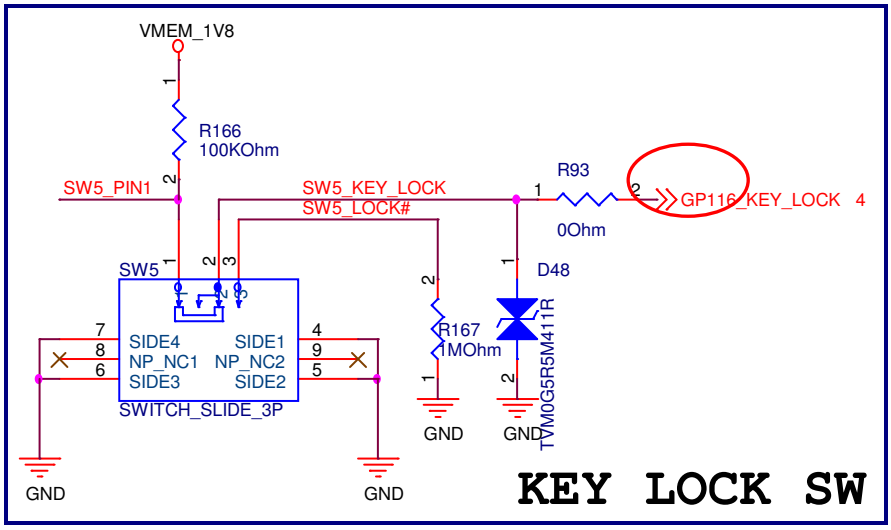


11.2 Button/ Keypad test

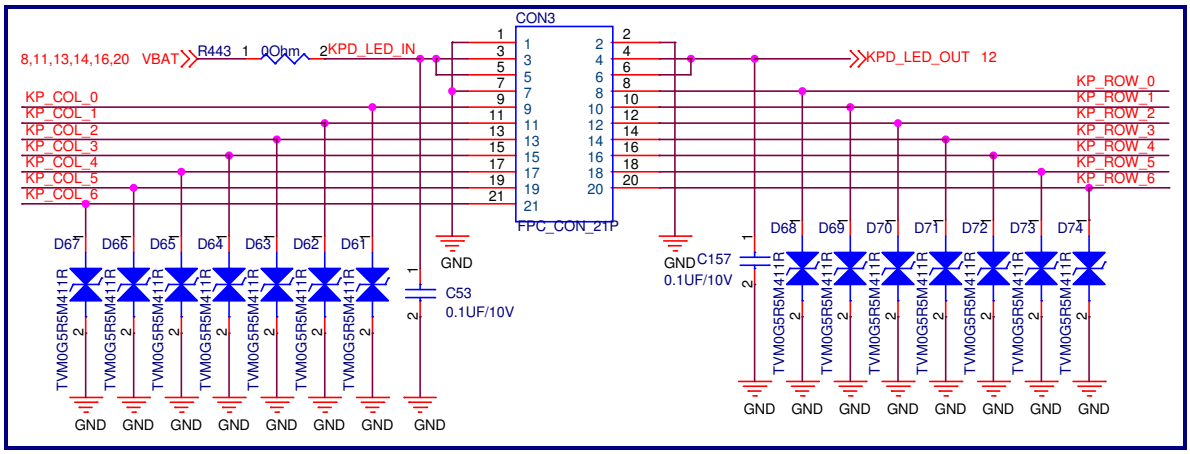
Button/ Keypad test. Please refer to below illustration if test results are NG.

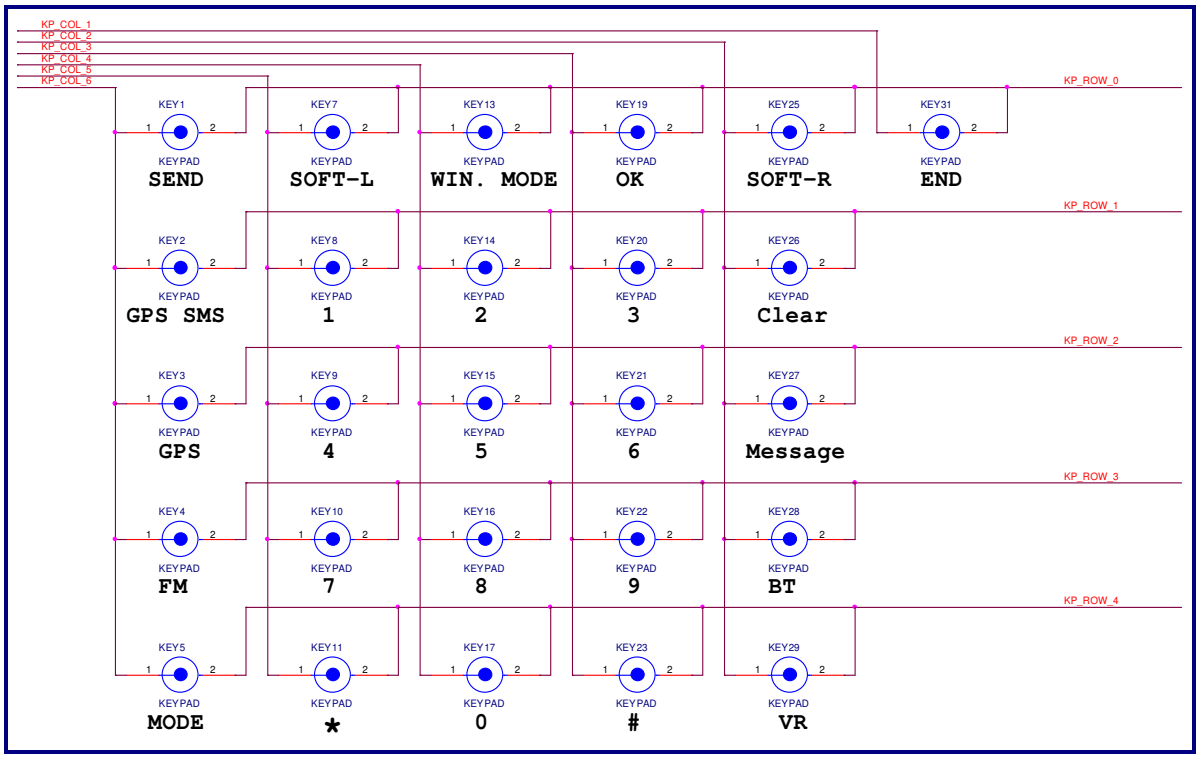
a. There are keypad, side key switch and navi key.

b. Except key lock switch uses GPIO116_KEY_LOCK (R93), the others are used key matrix for key detection. Please refer to key mapping as below.



a. There is keypad FPC connector on main board. Please compare relative Row and Column (Row is input and Column is output) if there is key malfunction occurs when we are doing test.





Considering other side key, please refer to schematic or other relevance components.

11.3 BT test mode

BT test mode (Auto) (UART interface only). The command comes from UART port. Please check below signals if the test result is NG.

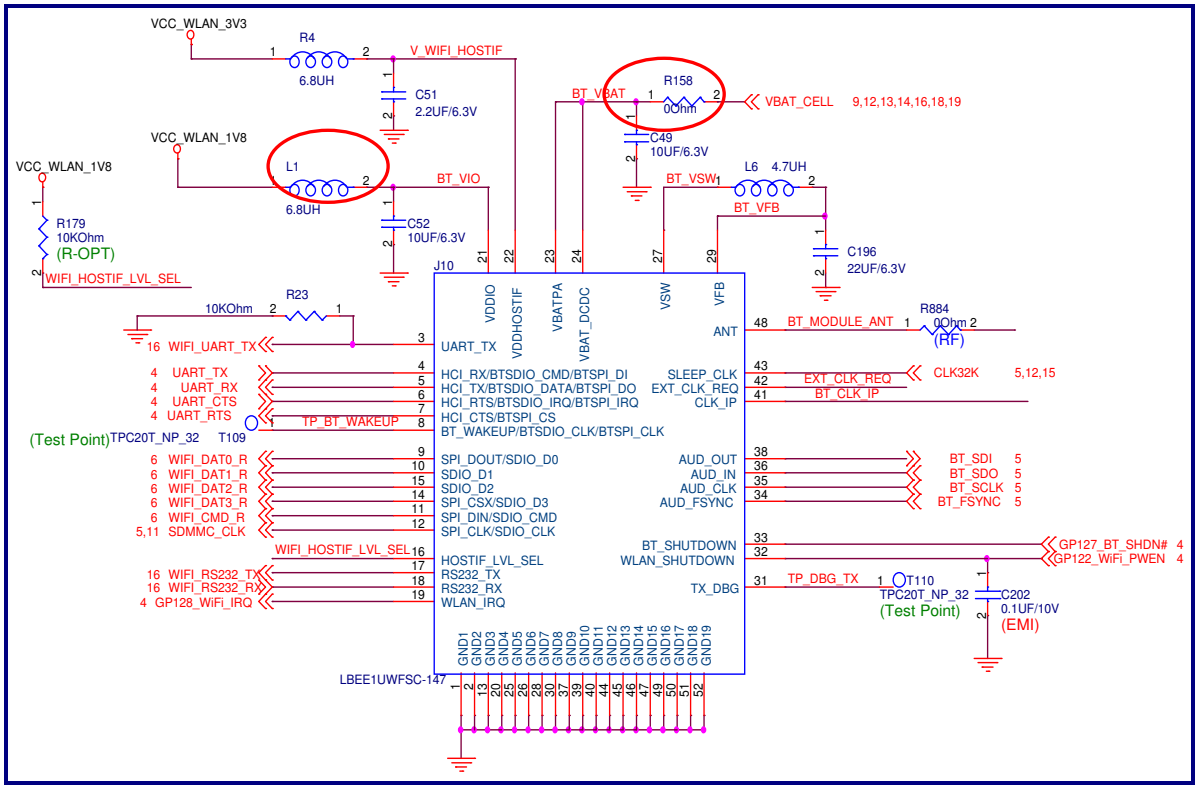
a. T13 is supposed to have oscillation signal of 32KHz clock.

b. The voltage value of L1 and Pin#1 of C52 is supposed to be 1.8V.

c. The voltage value of R158 and Pin#1 of C49 is supposed to be VBAT_CELL.

d. These signals can't be measured because there have no test points of P127_BT_SHDN# and UART port.

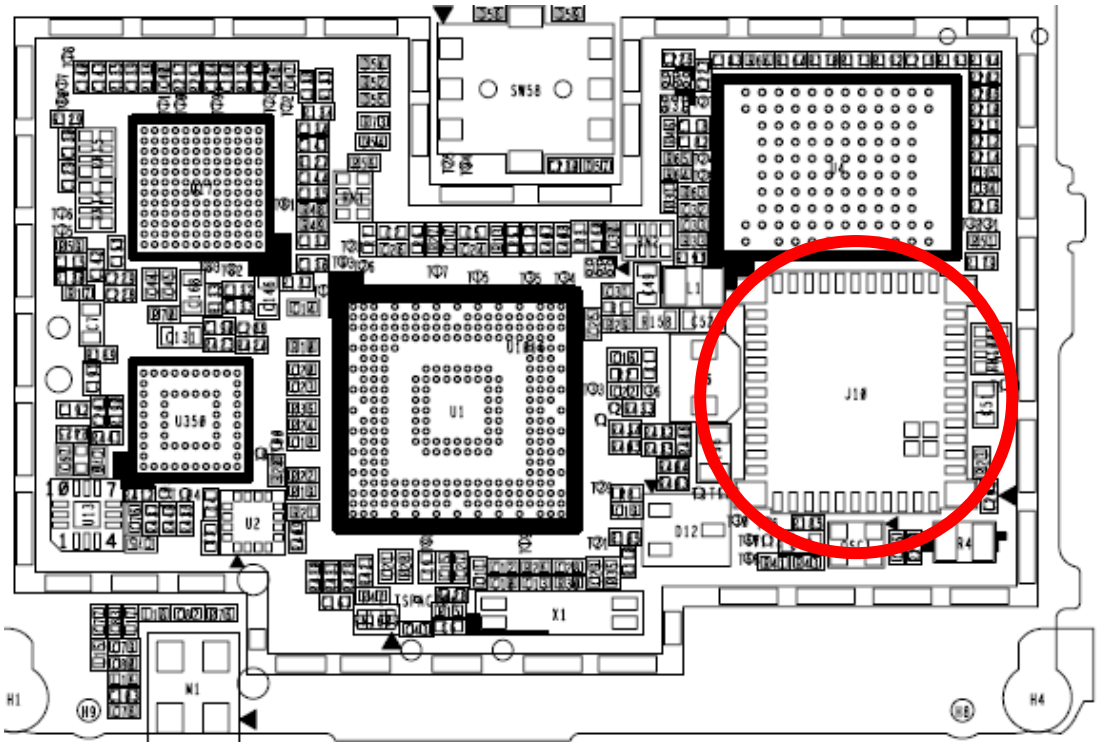
e. Please pay attention to disable Bluetooth function when we do BT test otherwise the test result of COM2 will be failed and shows COM2 open failed.



11.4 Storage test (Auto)

a. The test result of this test item is always passed.

b. M-System MCP (U4) component damaged or soldering issues may cause test result failed.



11.5 Display test

Display test (including backlight adjustment and LCM interface.

Please check below signals if test result is NG.

a. Make sure the GP138_LCM_PWR_EN voltage value of R234 and pin#1 of R96 is High (2.8V).

b. Make sure the voltage value of Pin#1 of C201, R232 and R233 is 2.8V.

c. Make sure the voltage value of GP43_LCD_RESET# (R95) is High (2.8V).

d. LCM interface is controlled by HS, VS and DE (data enable).

a. If LCM occurs white screen phenomenon, maybe the signals of LCM_PCLK (T51), LCM_HSYNC (T49), LCM_VSYNC (T50), and LCM_DE (R101) have problem or the signals of LCM_SPI_CS# (T54), LCM_SPI_SCL (T52),

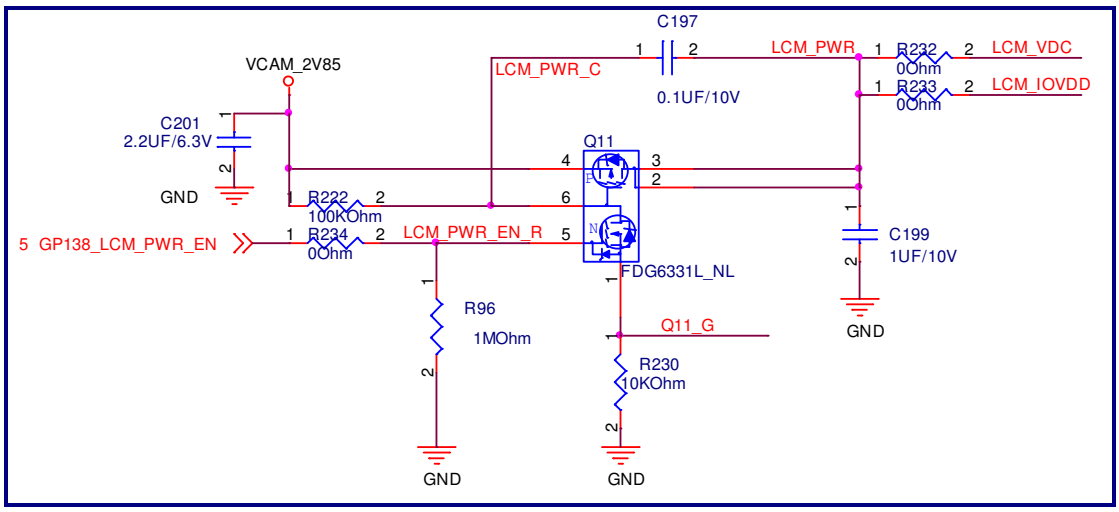
LCM_SPI_SDO (T53) and U16 are not correct. If LCM display abnormal, please check LCM_D0 ~ CM_D15.

e. LCM connector CON6 defective may be the cause of contact not well.

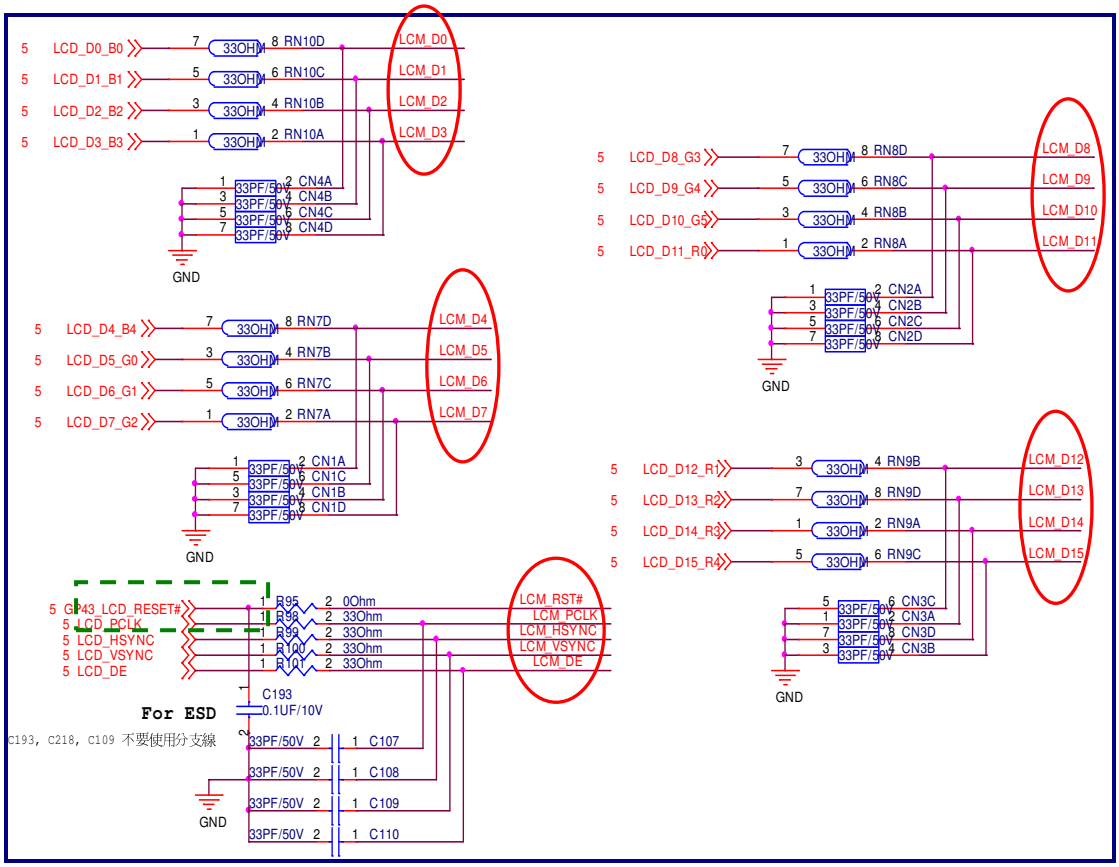
f. Backlight malfunction: The voltage of pin# 2 of R17 should be around 1V.

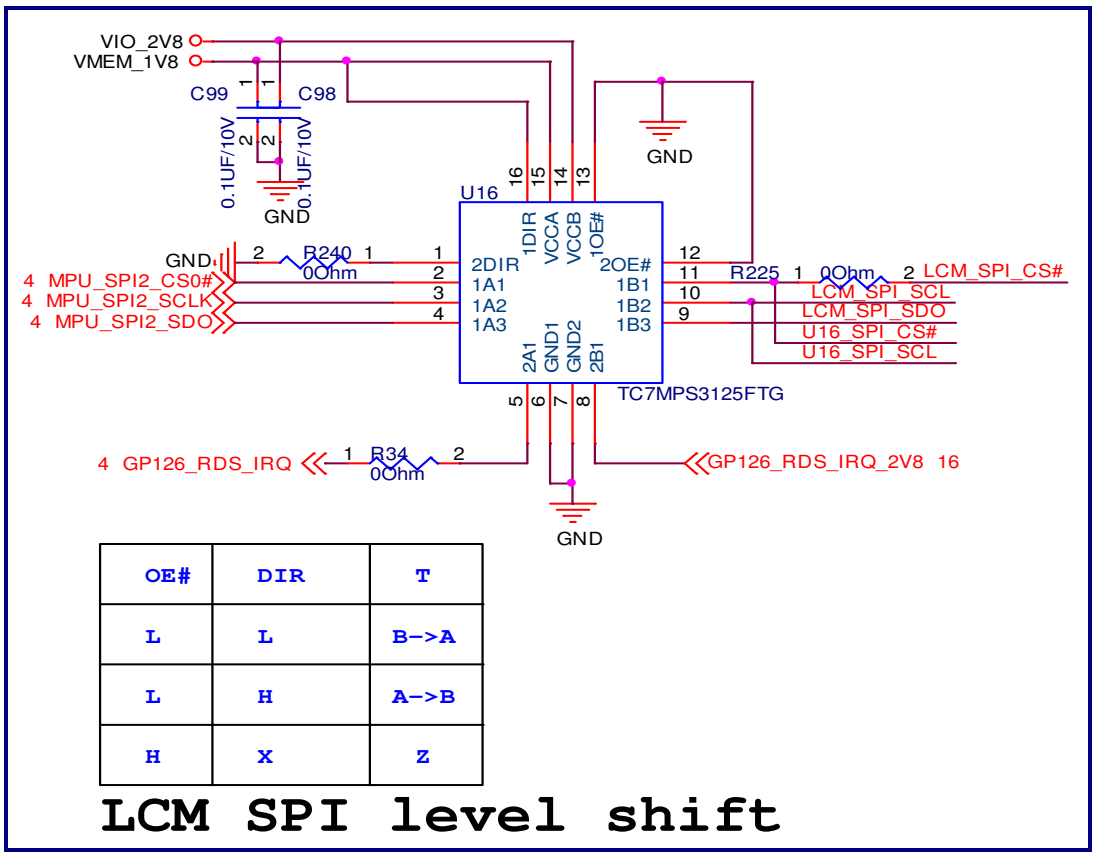
b. The voltage of Pin#1 of C64 is supposed to be equal to the voltage of VBAT. The voltage of R68 should be around 10V. The voltage of Pin#1 of R69 should be between 0.1 and 0.3V.

g. Backlight is not bright enough: Please make sure the voltage of pin#5 of Q10 (GP136_LOWLIHGT#) is High (2.8V) and check if R187 has connection abnormal situation.



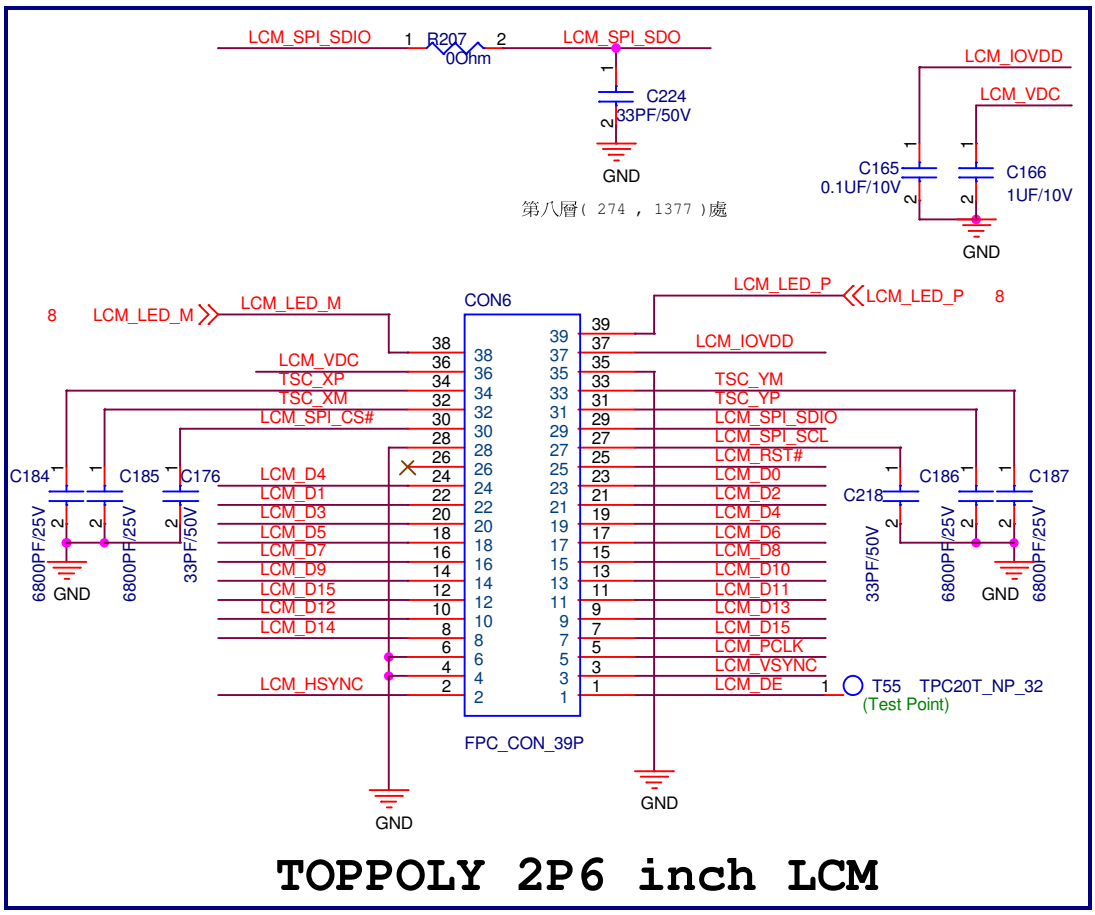
(Test Point)	TPC20T_NP_32	T46	LCM_D0	(Test Point)	TPC20T_NP_32	T52	LCM_SPI_SCL
(Test Point)	TPC20T_NP_32	T47	LCM_D5	(Test Point)	TPC20T_NP_32	T53	LCM_SPI_SDIO
(Test Point)	TPC20T_NP_32	T48	LCM_D15	(Test Point)	TPC20T_NP_32	T54	LCM_SPI_CS#
(Test Point)	TPC20T_NP_32	T49	LCM_HSYNC				
(Test Point)	TPC20T_NP_32	T50	LCM_VSYNC				
(Test Point)	TPC20T_NP_32	T51	LCM_PCLK				



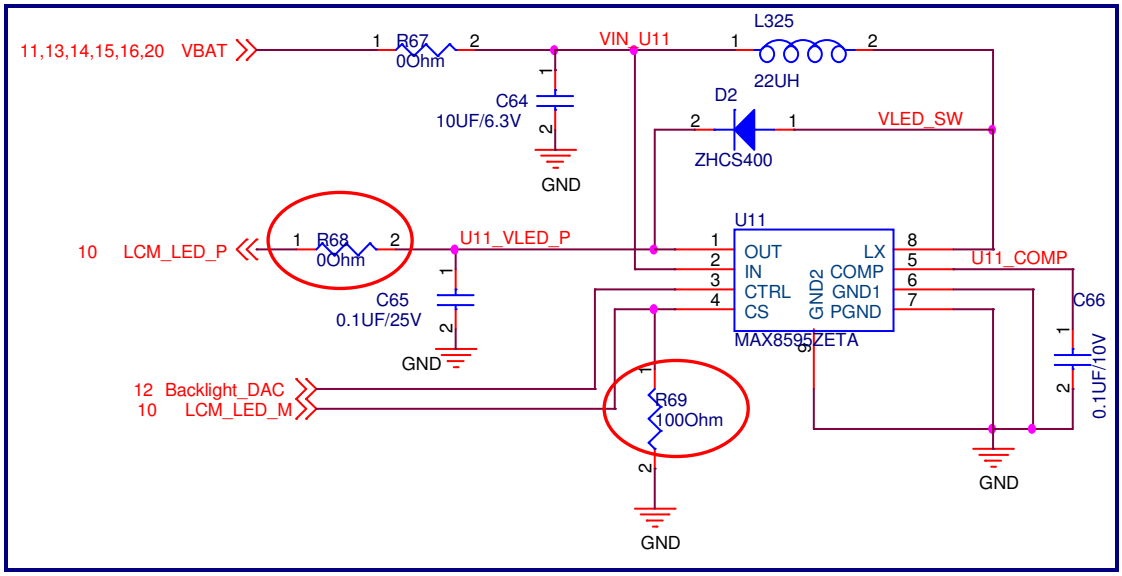


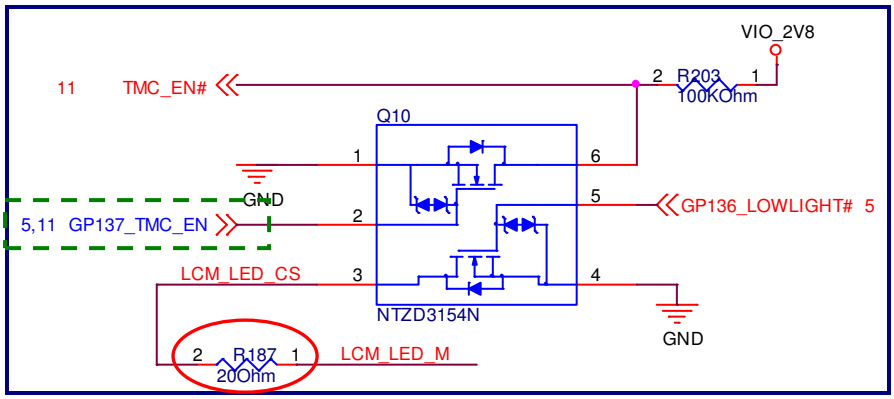
OE#	DIR	T
L	L	B->A
L	H	A->B
H	X	Z

LCM SPI level shift



Step-Up Converter for backlight




VIO_2V8
11
TMC_EN#
2
R203
1
100KOhm
Q10
1
6
GND
5
GP136_LOWLIGHT# 5
5,11 GP137_TMC_EN
2
LCM_LED_CS
3
4
NTZD3154N
GND
2
R187
1
LCM_LED_M
200hm

11.6 LED test

LED test (Auto) (Red, Green, and Blue) indicated LED test. Please check below signals if the test result is NG.

a. Test program will operate and LED light will be flash in order of three RGB color. There must has problem if one of three color does not flash.

b. To know LED electronic circuit, please refer to below diagram.

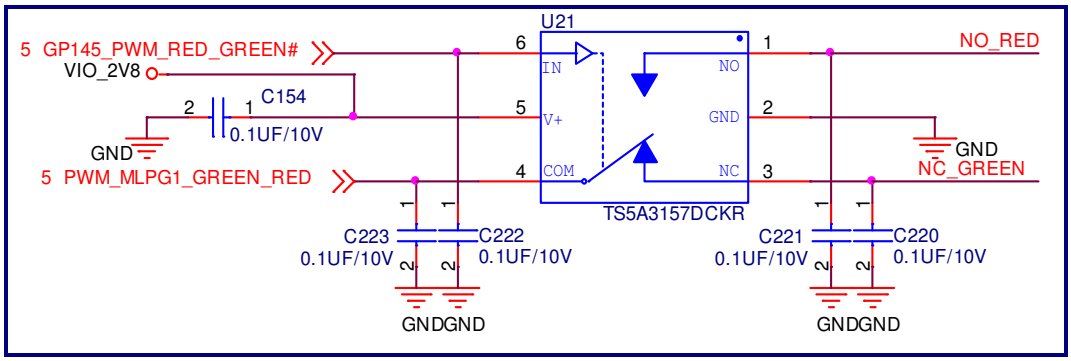
c. The signal of PWM_MLPG1_GREEN_RED is the source of red LED and green LED. The Pin#4 of U21 is 2.8V.

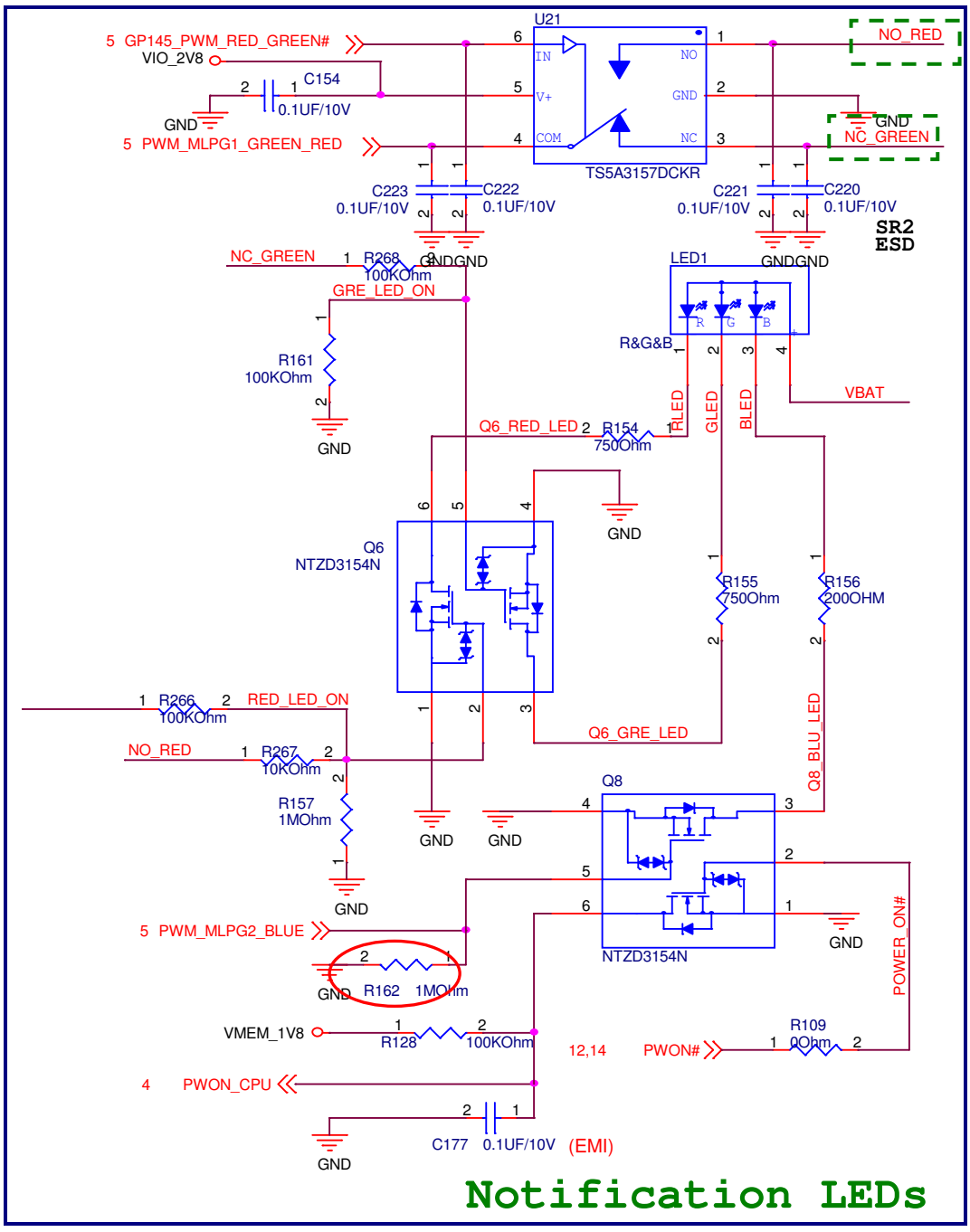
d. The red LED and the green LED is controlled by GP145_PWM_RED_GREEN# Pin#6 of U21). If GP145_ PWM_RED_GREEN# is 2.8V, it shows red LED. If GP145_PWM_RED_GREEN# is 0V, it shows green LED.

e. NO_RED (Pin#1 of U21) is connected to control signal of red LED (2.8V is bright, 0V is dark).

f. NC_GREEN (Pin#3 of U21) is connected to control signal of green LED (2.8V is bright, 0V is dark).

g. PWM_MLPG2_BLUE (pin#1 of R162) is connected to control signal of blue LED (2.8V is bright, 0V is dark).




U21
TS5A3157DCKR
5 GP145_PWM_RED_GREEN#
VIO_2V8
C154
0.1UF/10V
GND
5 PWM_MLPG1_GREEN_RED
C223 0.1UF/10V
C222 0.1UF/10V
C221 0.1UF/10V
C220 0.1UF/10V
NO_RED
NC_GREEN
SR2 ESD
NC_GREEN
R268 100KOhm
GRE_LED_ON
R161 100KOhm
LED1
R&G&B
VBAT
RLED
GLED
BLED
Q6_RED_LED
R154 750Ohm
Q6 NTZD3154N
R155 750Ohm
R156 200OHM
R266 100KOhm
RED_LED_ON
NO_RED
R267 10KOhm
R157 1MOhm
Q6_GRE_LED
Q8_BLU_LED
Q8
NTZD3154N
5 PWM_MLPG2_BLUE
R162 1MOhm
VMEM_1V8
R128 100KOhm
12,14
PWON#
R109 0Ohm
POWER_ON#
4 PWON_CPU
C177 0.1UF/10V (EMI)
Notification LEDs

11.7 Vibrator test

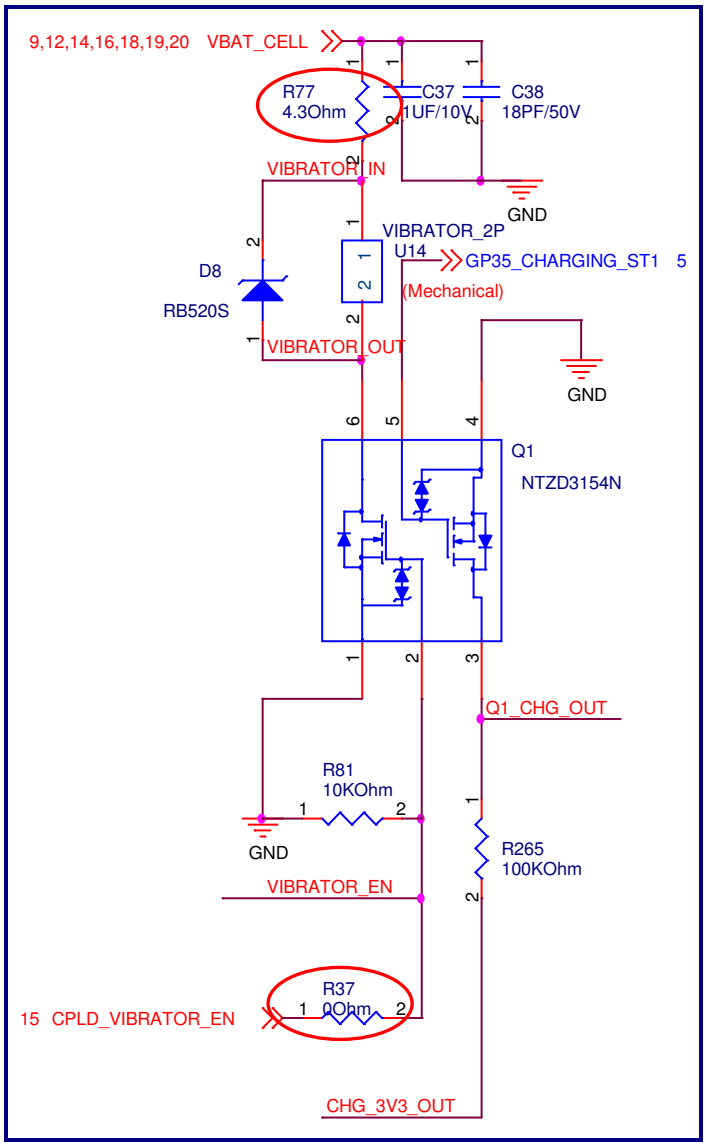
Vibrator test (Auto). Please check below signals if test result is failed.

a. Vibrator is vibrated when we do vibrator test.

b. Please refer to below circuit diagram if it can't vibrate.

c. Check the voltage of R77 should same as voltage of VBAT.

d. Vibrator will turn around when the voltage of CPLD_ VRIBRATOR_EN (pin1 of R37) is 2.8V.



11.8 Micro-SD test

a. Micro-SD test (Auto):

b. This test should be passed because test program was loaded in micro-SD card when we do MMI tests.

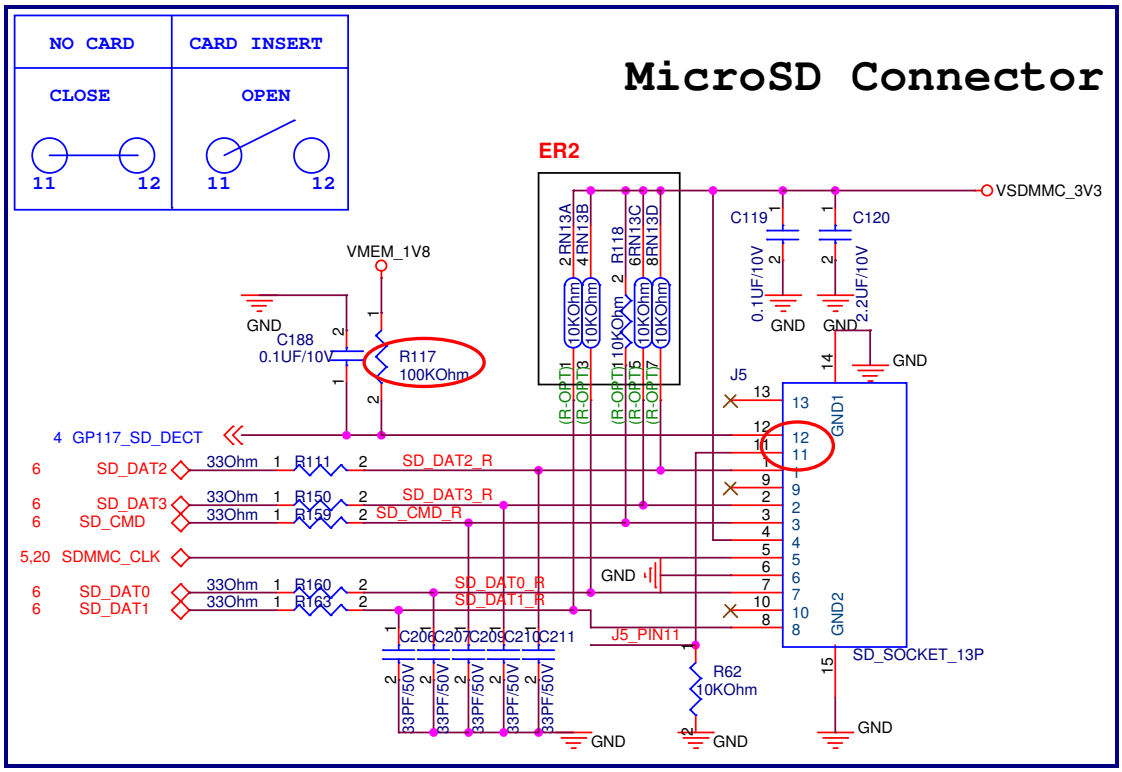
c. If test program is loaded fail, it is because OS can power on but test system can't operate. Please check below signal if this situation occurred.

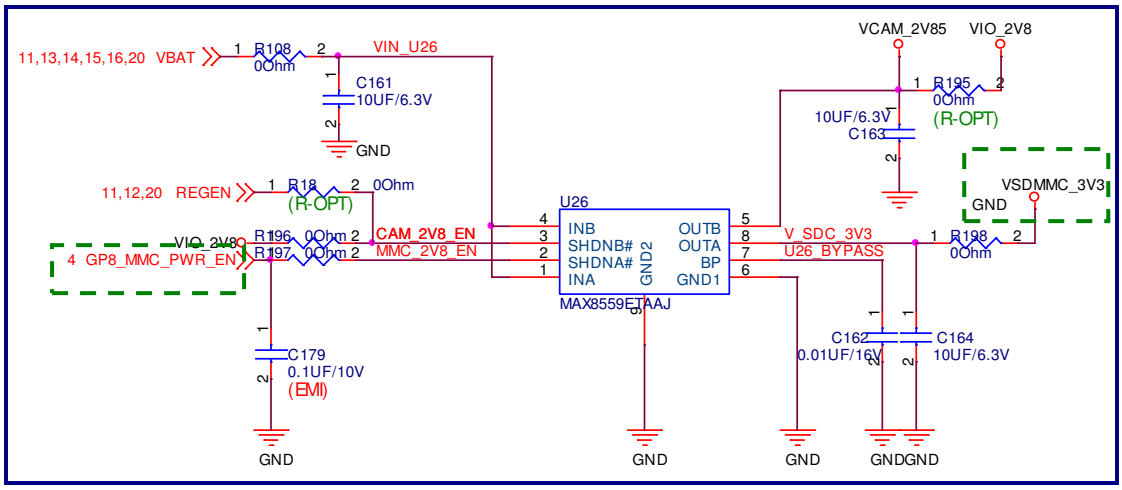
d. The voltage value of GP117_SD_DECT (pin#2 of R117) should be High (1.8V) provided Micro-SD card was plugged. Please check if pin11 & pin12 of J5 is OPEN when the voltage value is Low.

e. The voltage of VSDMMC_3V3 should be 3.3V. It means the voltage value of GP8_MMC_PWR_EN located in U26 should be High (pin#1 of R197).

f. SD card interface should have signal when CPU is reading data from Micro-SD.

g. If above signals are normal but test result is NG. It may be due to SD card socket problem.





11.9 SDRAM test (Auto)

SDRAM test should be passed if the system can operate.

Please check SDRAM signal related to MCP (U4) if test result is failed.

11.10 RTC test (Auto)

Test result of this item should be passed. RTC value is from counting 32K clock. System cannot power on if 32K clock has problem. Hence, result of this test is never failed. Please check 32K clock (X1) or change OMAP850 (U1).

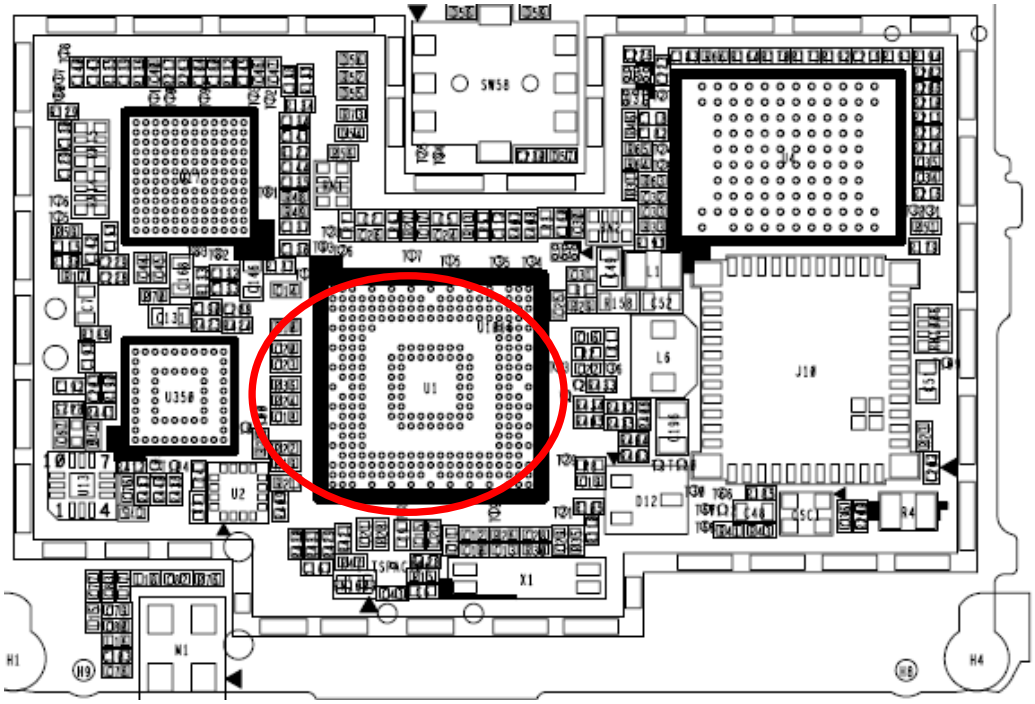
11.11 Version check (Auto)

a. S/W version check is not related to H/W. The test result of this item is always passed.

b. Please make sure the S/W version is correct or S/W program itself has bugs if the test result is failed.

11.12 Turn On/Off Radio (Auto)

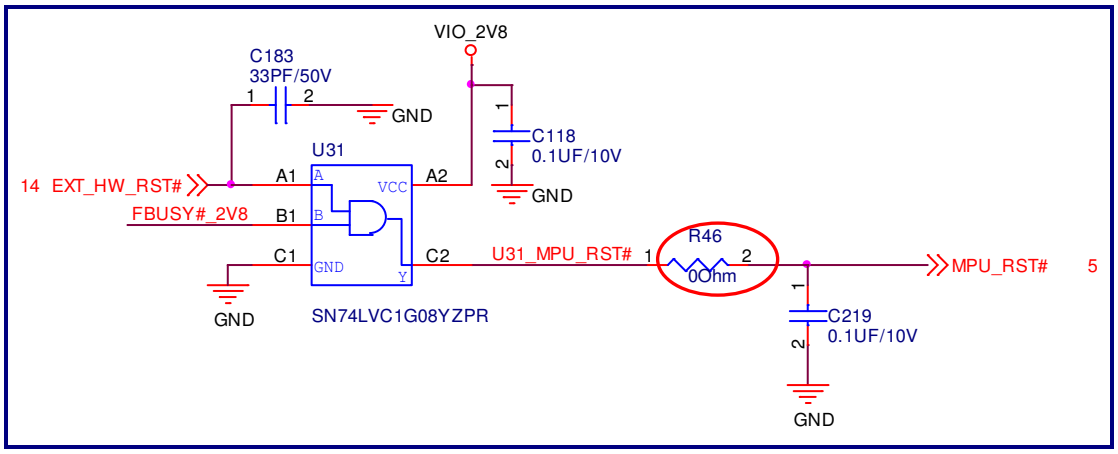
This test is to check if there is connection problem between MPU and GSM. The test result of this test item is always passed. The test is failed may be because S/W program or OMAP850 (U1) have problem.

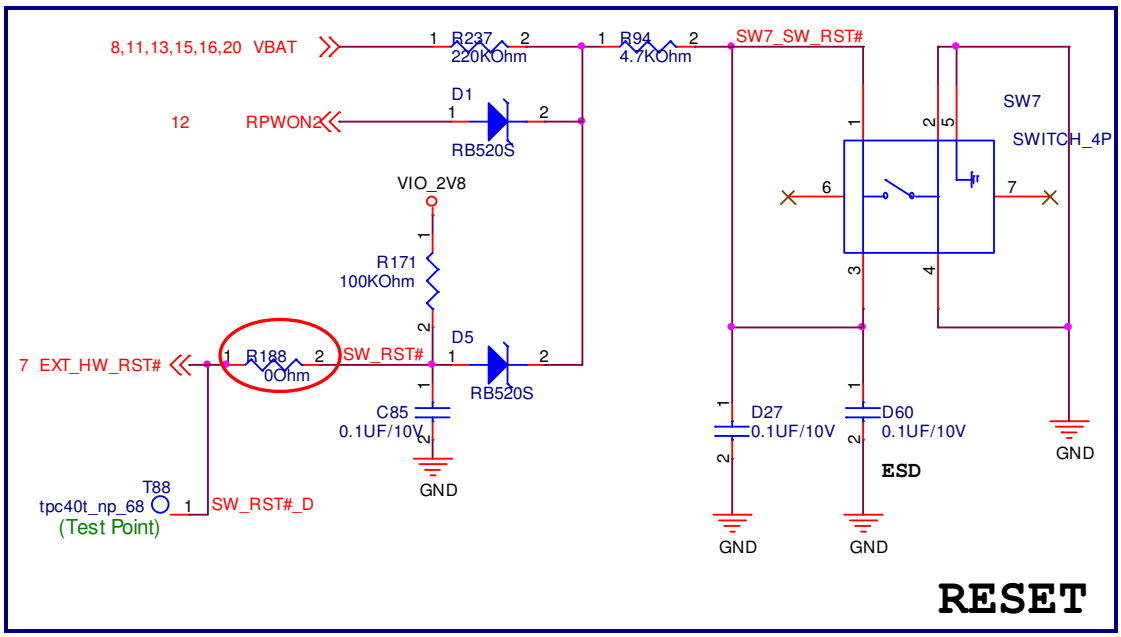


11.13 Reset Button

a. This test is to make sure reset key can work properly. Please check below signal if the test result is negative.

b. The voltage of MPU_RST# (R46) should be Low (0V) when reset button, SW7, was pressed. Meanwhile, voltage of EXT_HW_RST# (R188), Pin#1 and Pin#3 of SW7 should be Low (0V).

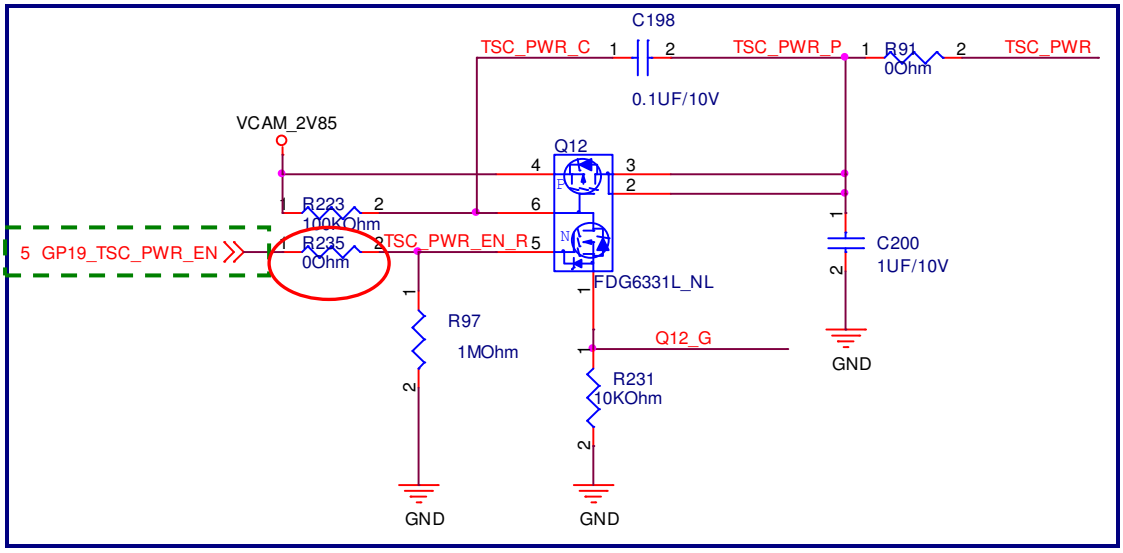


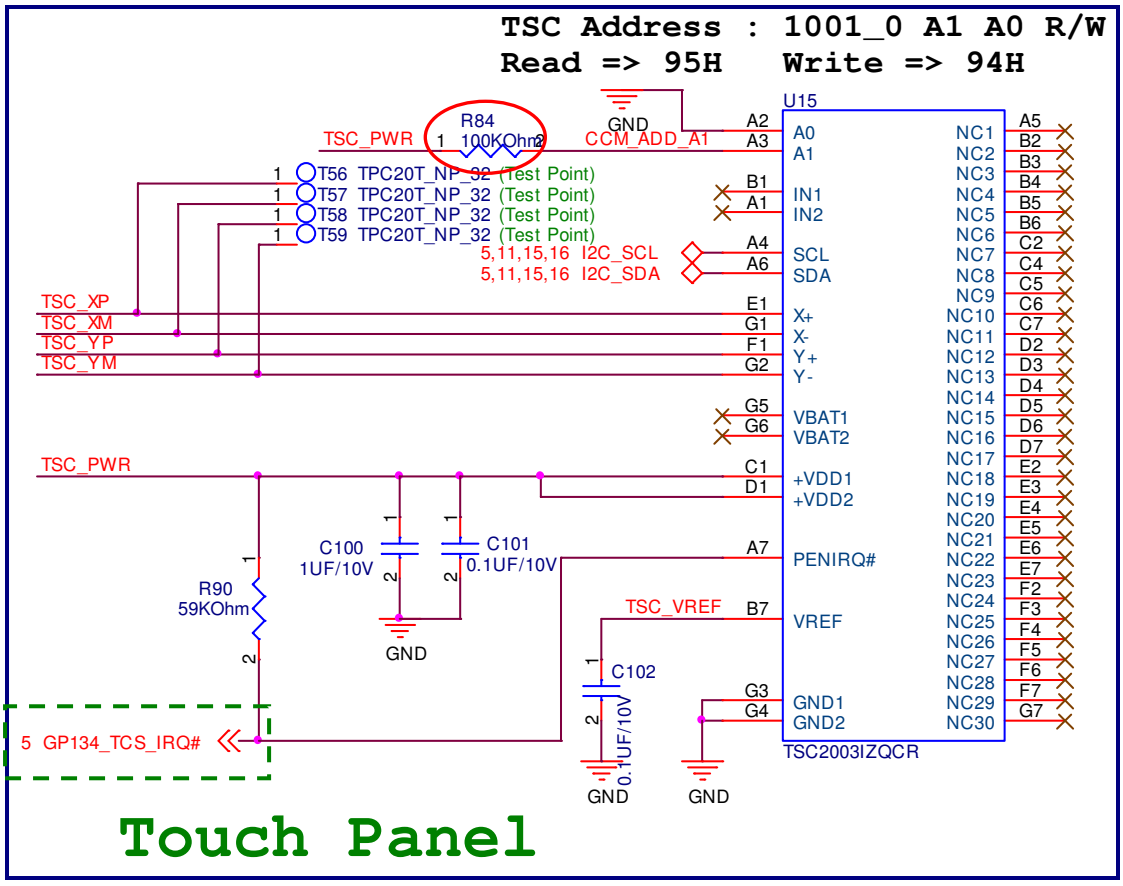


Note: Item no. 14 to 18 are Box Build test items and board level tests has not included.

11.14 Touch panel calibration

- (since LCM is different from board level one) Touch panel calibration process was finished at board level test. We need to do box build again because LCM and touch panel were changed.
- Please make sure assembly processes or LCM panel itself if the test result is NG.
- Please refer to repair process of display test in test items 5, if test results for above item a, b tests are positive and the cause is LCM display NG. Please check below signal if touch panel is out of order.
- The voltage of GP19_TSC_PWR_EN (R235) should be High (2.8V) and the voltage of TSC_PWR (R91, R84) should be 2.8V. The voltage values of TSC_XP (T56),
- TSC_XM (T57), TSC_YP (T58) and TSC_YM (T59) should be variable when touch panel is pressed. Meanwhile, there is interruption Low signal GP134_TCS_IRQ# (Pin#2 of R90) released to CPU.
- You should see signal from I2C_SCL (Pin#4 of RN1009) and I2C_SDA (Pin#2 of RN1009) when IC is collect data.





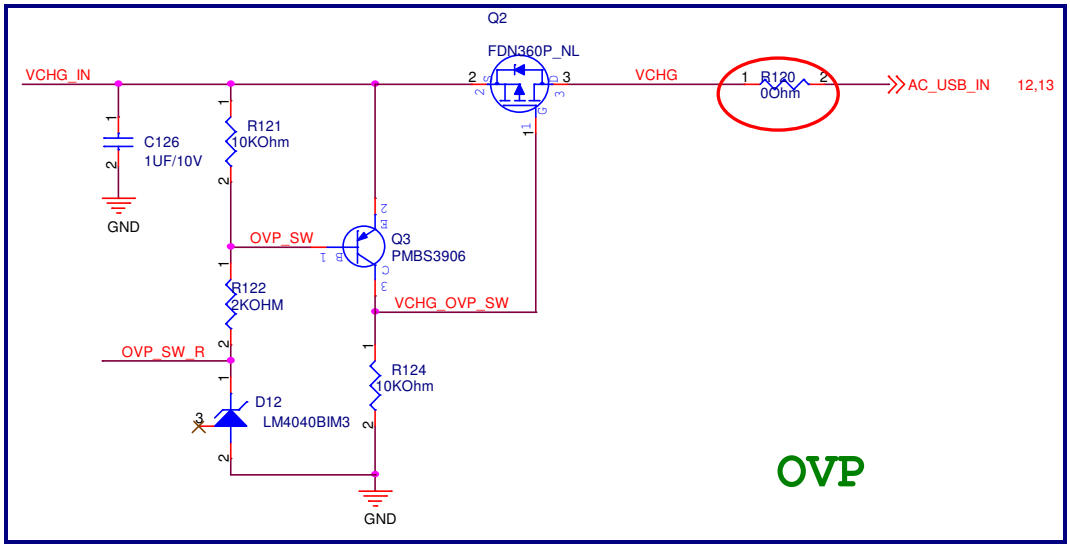
11.15 Battery test (Auto)

a. The main purpose of battery test is to make sure charging function can operate successfully.

b. The test way is to read battery capacity through one wire interface. The test result is passed provided battery capacity increased by 1%.

c. OVP circuit is to prevent from charging IC being damaged when voltage is over high during charging process.

d. Cut off point is around 6V. The VCHG_IN in below diagram is to connect to the VBUS , standard voltage is 5V, of USB connector.



a. The voltage of AC_USB_IN (R120) should be 5V when plugging in charger. Charging IC (U18) will work when battery temperature is normal (we use 10K NTC to connect BAT_TS#).

b. We can monitor current charging IC situation by checking the values of Status pins GP35_Charging_ ST1 and 86_Charging_ST2.

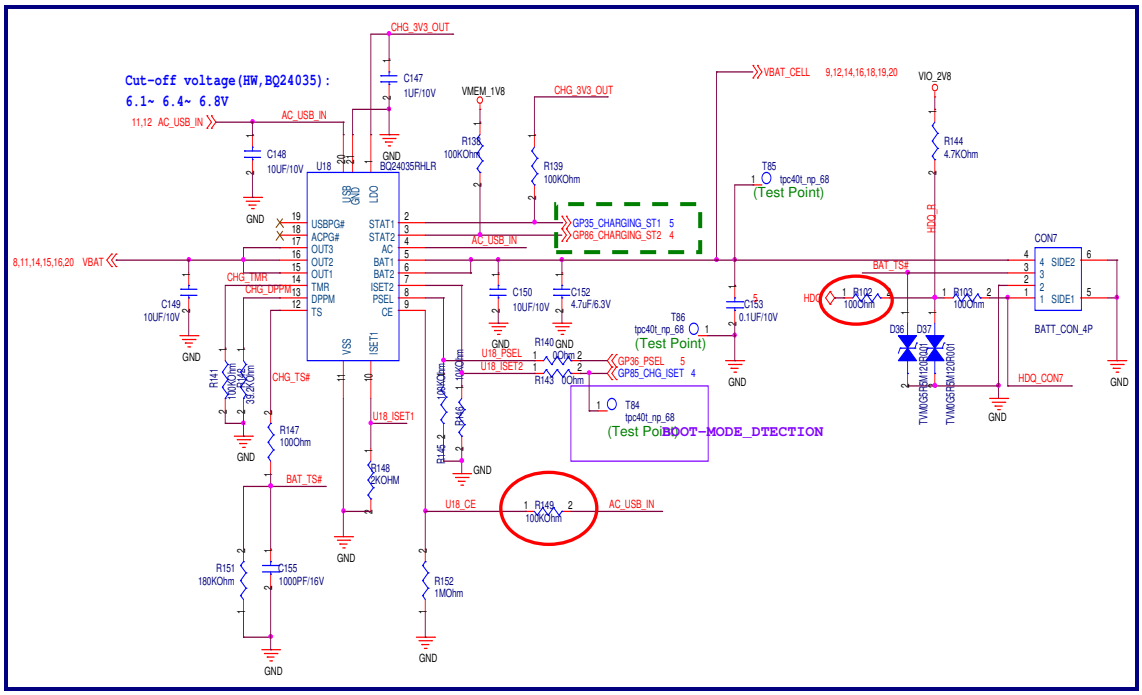
c. When charger IC is working, the voltage value of GP35_Charging_ST1 is low 0V) and the voltage value of P86_Charging_ST2 is High (1.8V).

d. At this moment, the voltage value of GP36_PSEL is high (3.3V), it means battery is charged through AC mode.

e. The current value is 500mA set controlled by R148 (2K ohm).

f. The voltage value of Pin#2 of R149 (Chip enable) is High (5V)

e. The signal of HDQ, one wire interface, R102, should be signal.



11.16 Camera test

Please check below signals if the test result is negative.

The signals of Camera interface are HS and VS signals same as the signals of LCM interface. The power voltage of AVDD, IOVDD need 2.8V and DVDD need 1.8V.

It controlled by I2C interface.

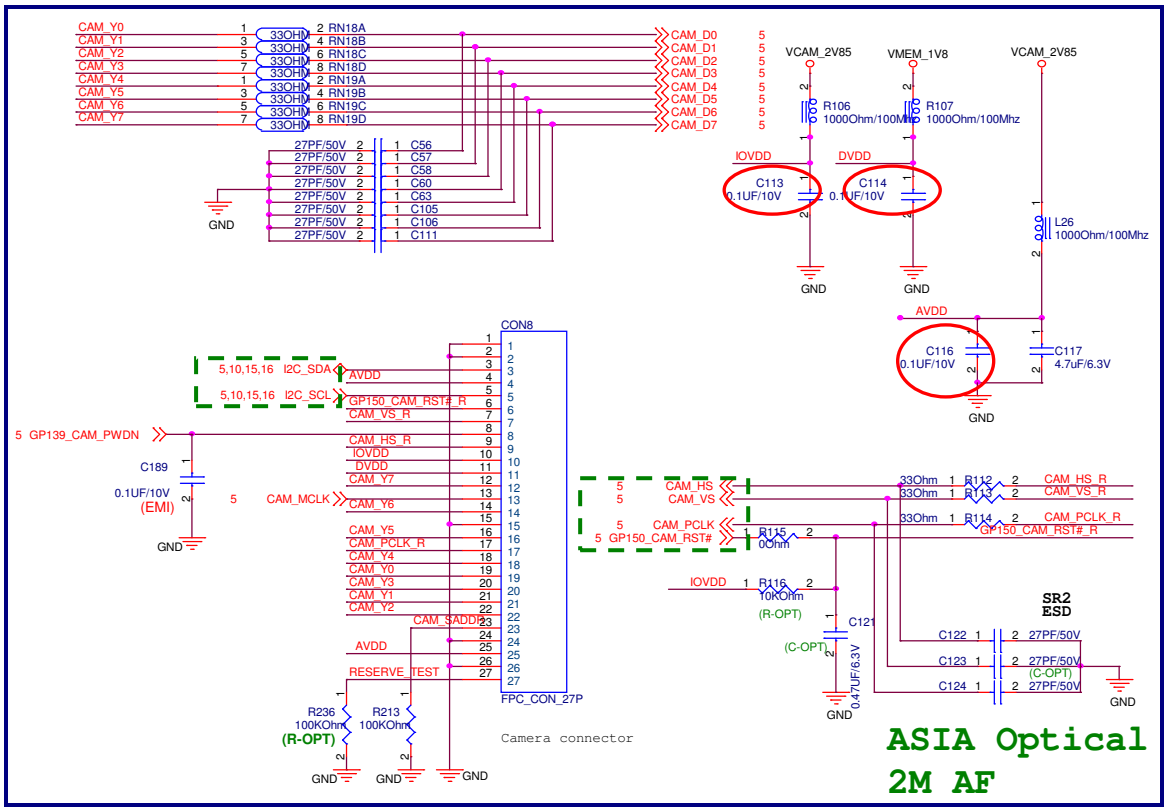
Please make sure the voltage values of AVDD (Pin#1 of C116), IOVDD (Pin#1 of C113) and DVDD (Pin#1 of C114) are 2.8V, 2.8V and 1.8V respectively if Camera test result is NG.

The voltage of GP150_CAM_RST# (R115) should be High (2.8V). CAM_MCLK (R13) should have clock out.

CAM_PCLK (R114) should have clock out. The signal line of other camera interface should be normal as well.

The signal of I2C_SCL and I2C_SDA should be normal.

We suggest checking Camera function since camera module may be defective during assembly process or itself defective.



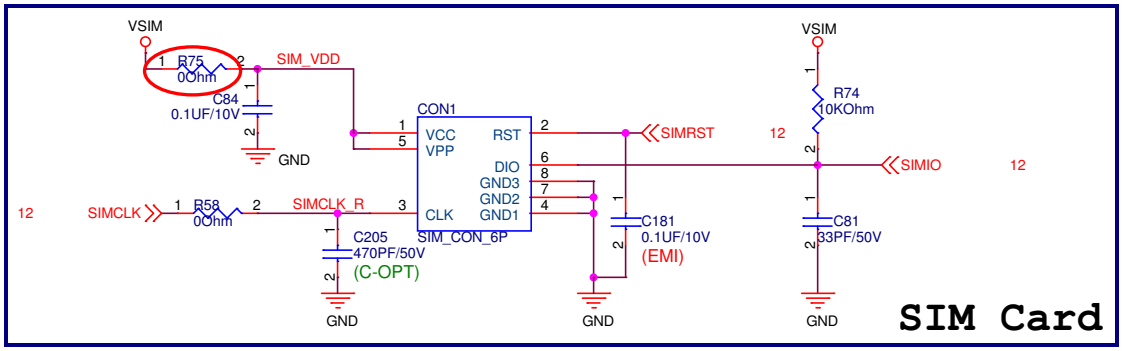
11.17 Check SIM (Auto)

a. Main purpose of SIM test is to make sure SIM card can operate normally. Please check below signals if test result is negative.

b. P527 can support standard 3V SIM card and 1.8V SIM card. The signal of SIM_VDD (R75) is 1.8V or 3V. The reset signal, SIMRST, is supposed to be low when reading data.

c. Both clock (SIMCLK) and data (SIMIO) should have signals when access data.

f. It is easy to have poor soldering problem during manufacturing process since the thickness of pin of SIM socket is thicker than other components.

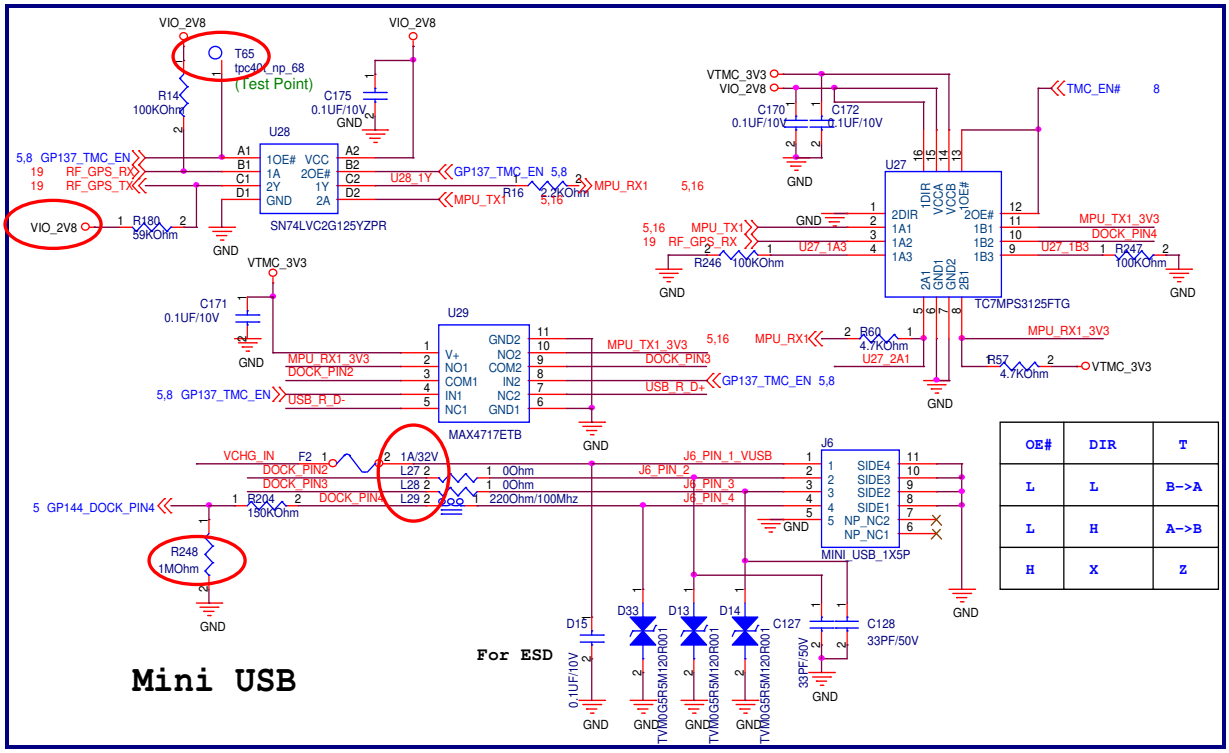


11.18 TMC test (Auto)

a. Main purpose of TMC test is to make sure the TMC can operate normally. Please check below signal if TMC can't operate normally.

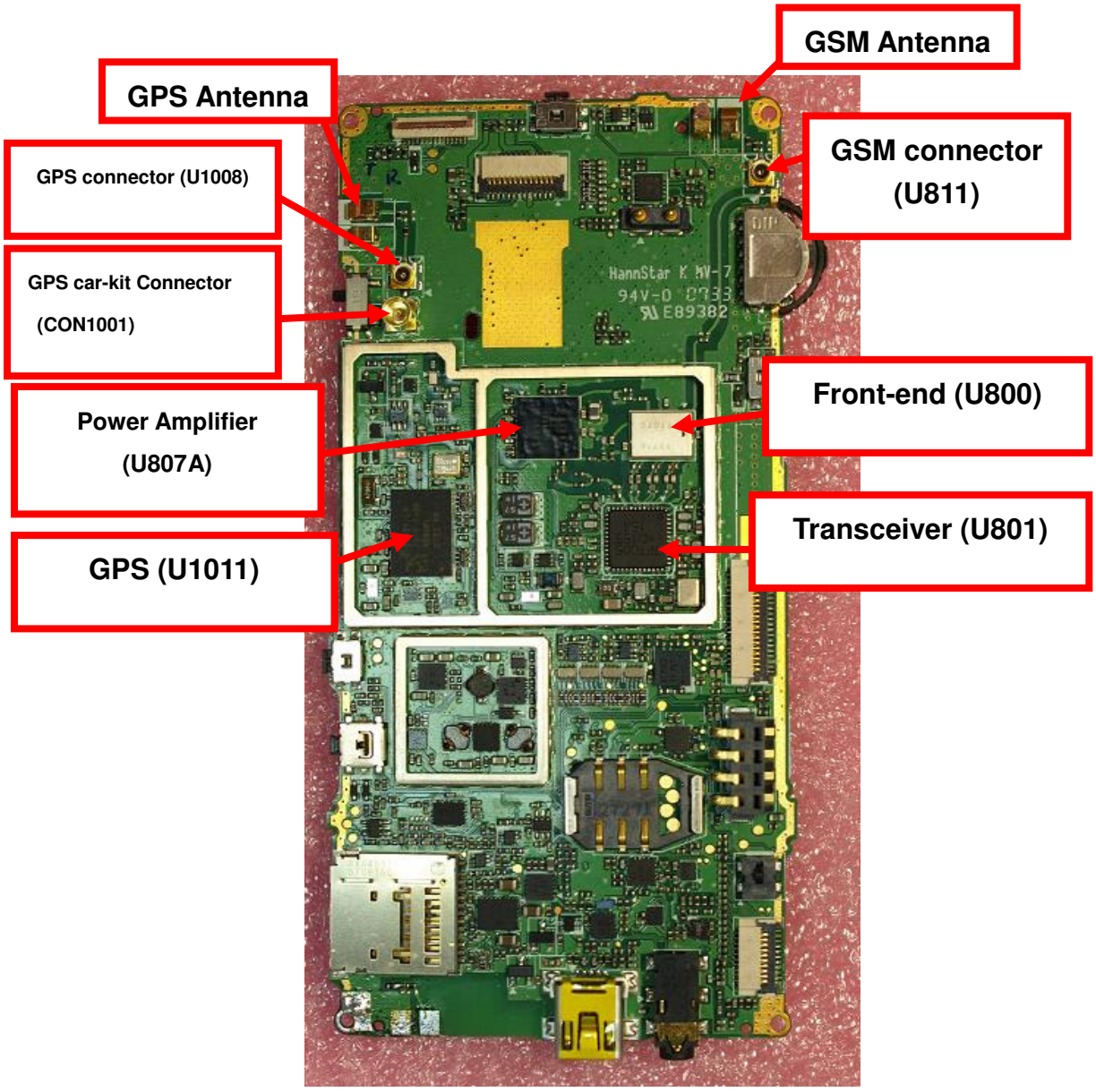
b. TMC function operates normally depending on three signals, MPU_TX1 (T4), MPU_RX1 (T5) and RF_GPS_RX (pin#2 of R180). The voltage value of GP137_TMC_EN (T65) should be 2.8V and it is a trigger to make TMC function operates normally. U28 is no function when TMC function operates normally. However, OE# (output enable) of U27 is supposed to be connected to TMC_EN#, U27 is enabled. The paths of three signals are as below. The signal between U27and USB connector is 3.3V. L27 and L28 have normal signal when TMC function operate normally.

GP144_DOCK_PIN4 is TMC detect pin. Hence, the voltage of GP144_DOCK_PIN4 (Pin#2 of R248) is around 2.8V.



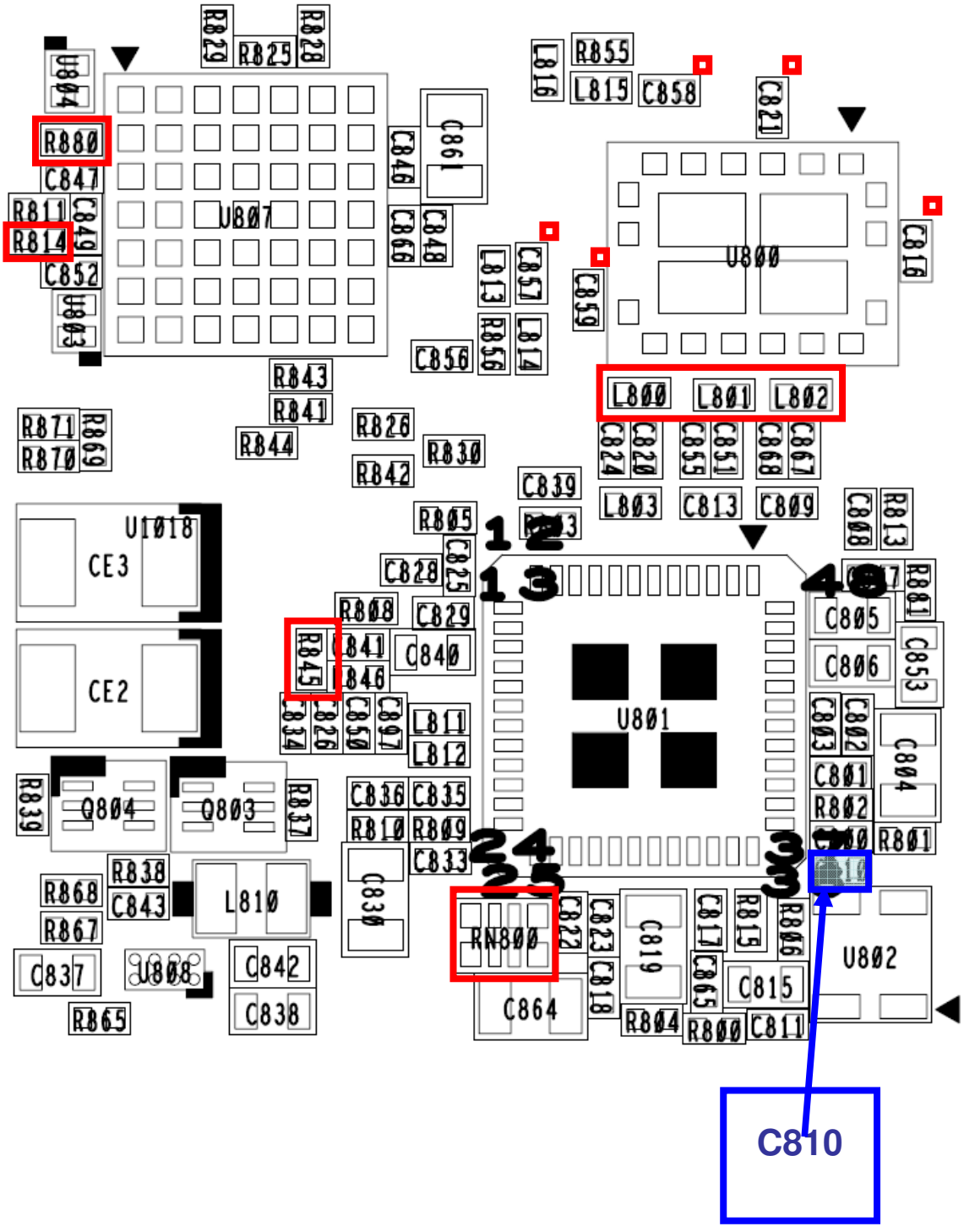
12. Component placement-RF

12.1Main Chip



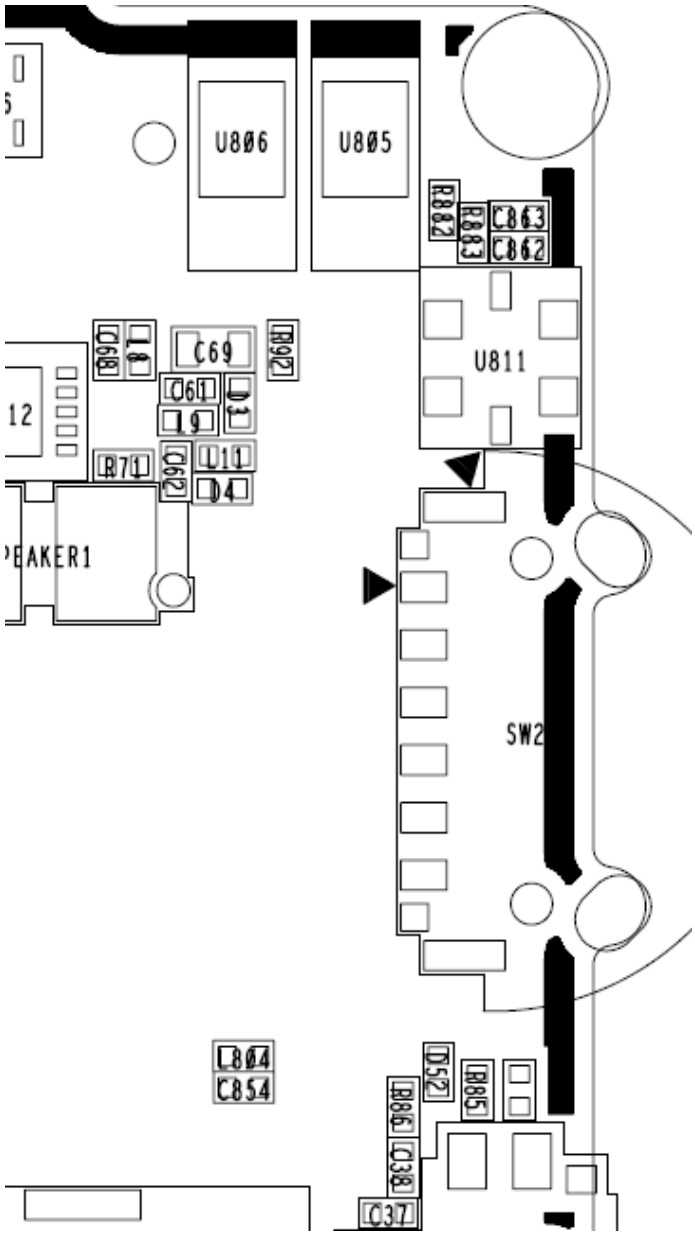
12.2 FEM , PA , Transceiver

Front End (RF switch), Power Amplifier, & Transceiver



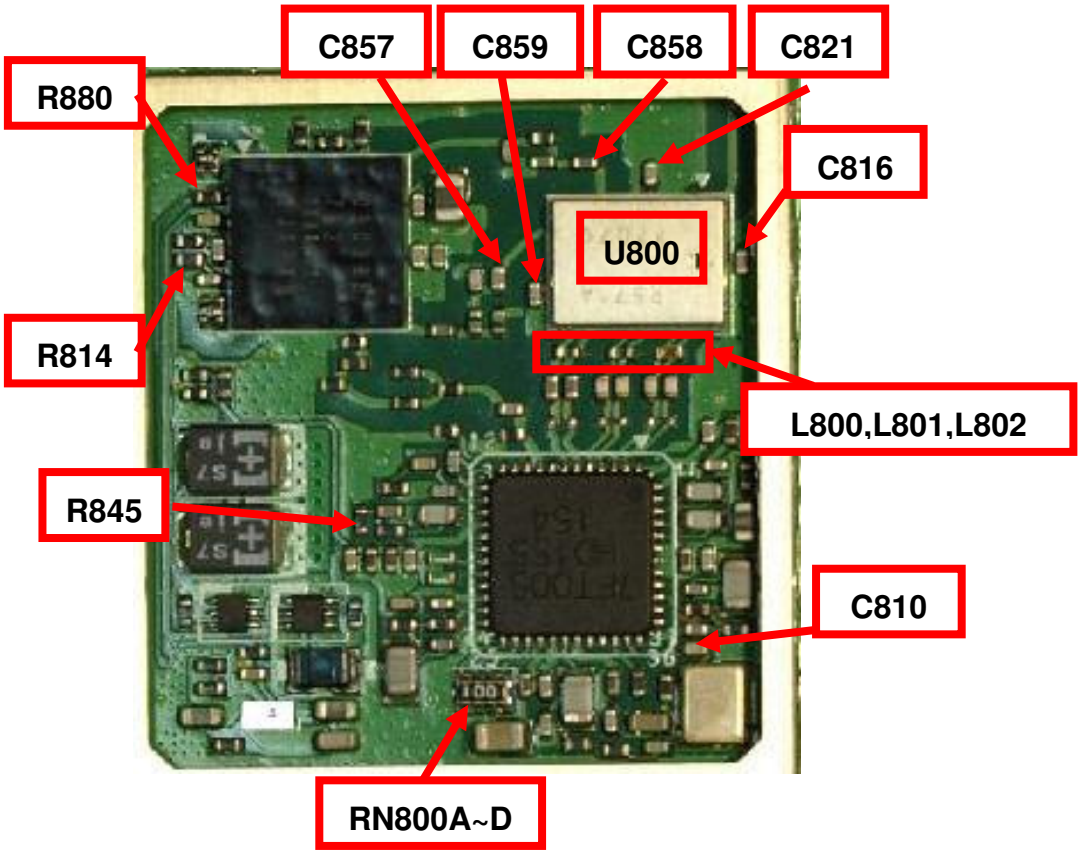
12.3 GSM Antenna

GSM Antenna

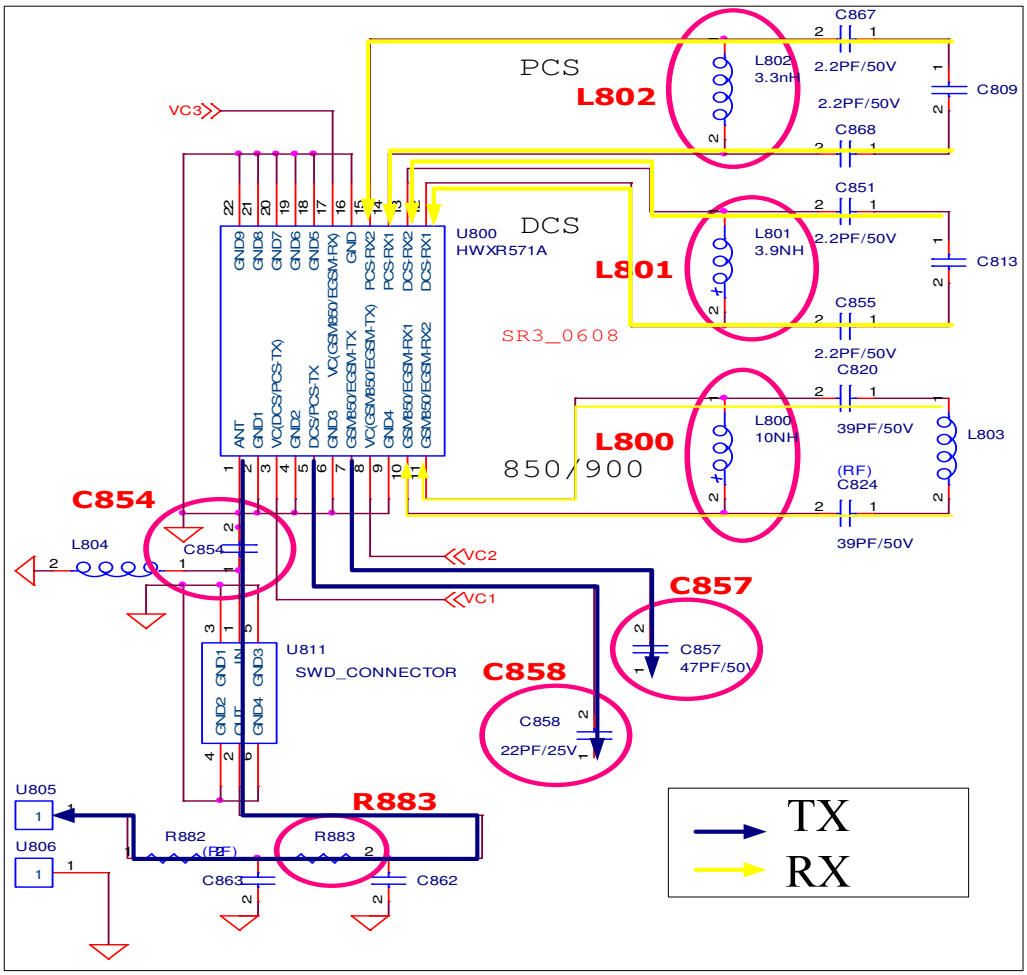


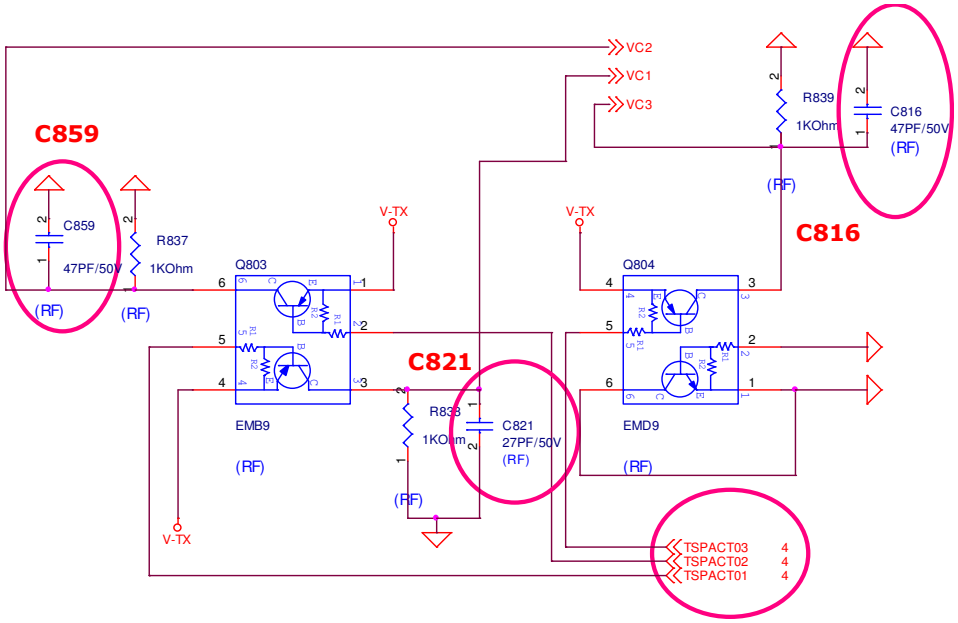
12.4 Test points

Front End (RF Switch) part: Including GSM antenna regions and

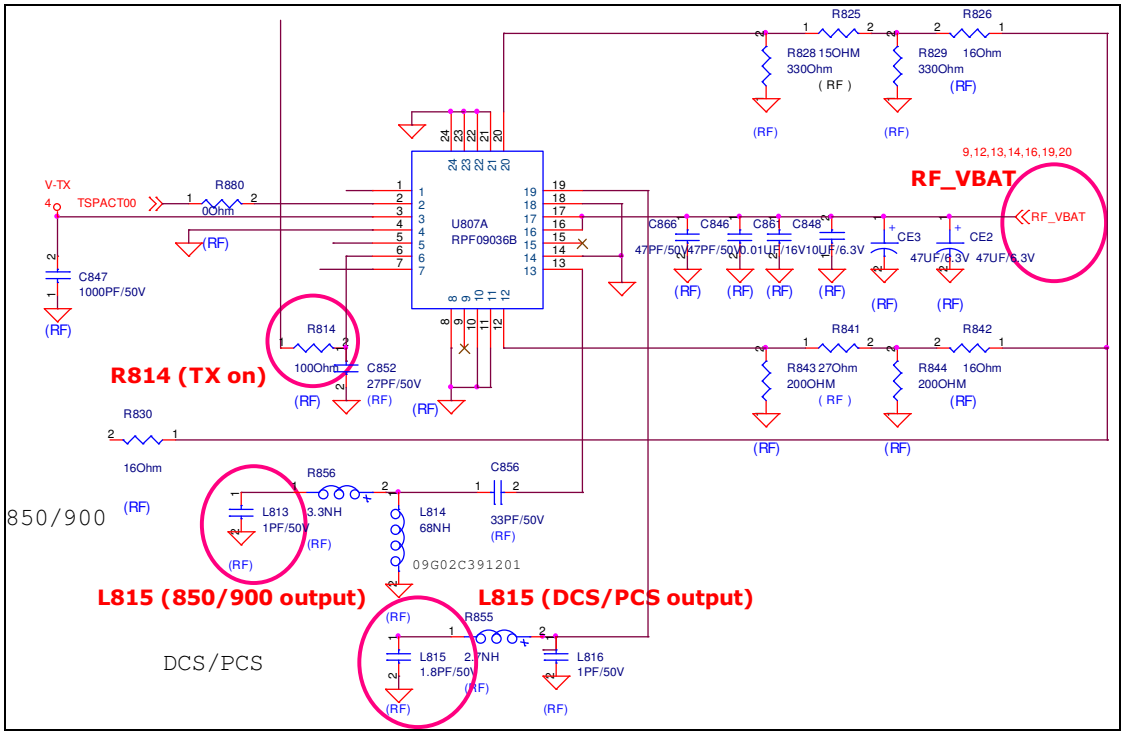


12.5 TX/ RX path

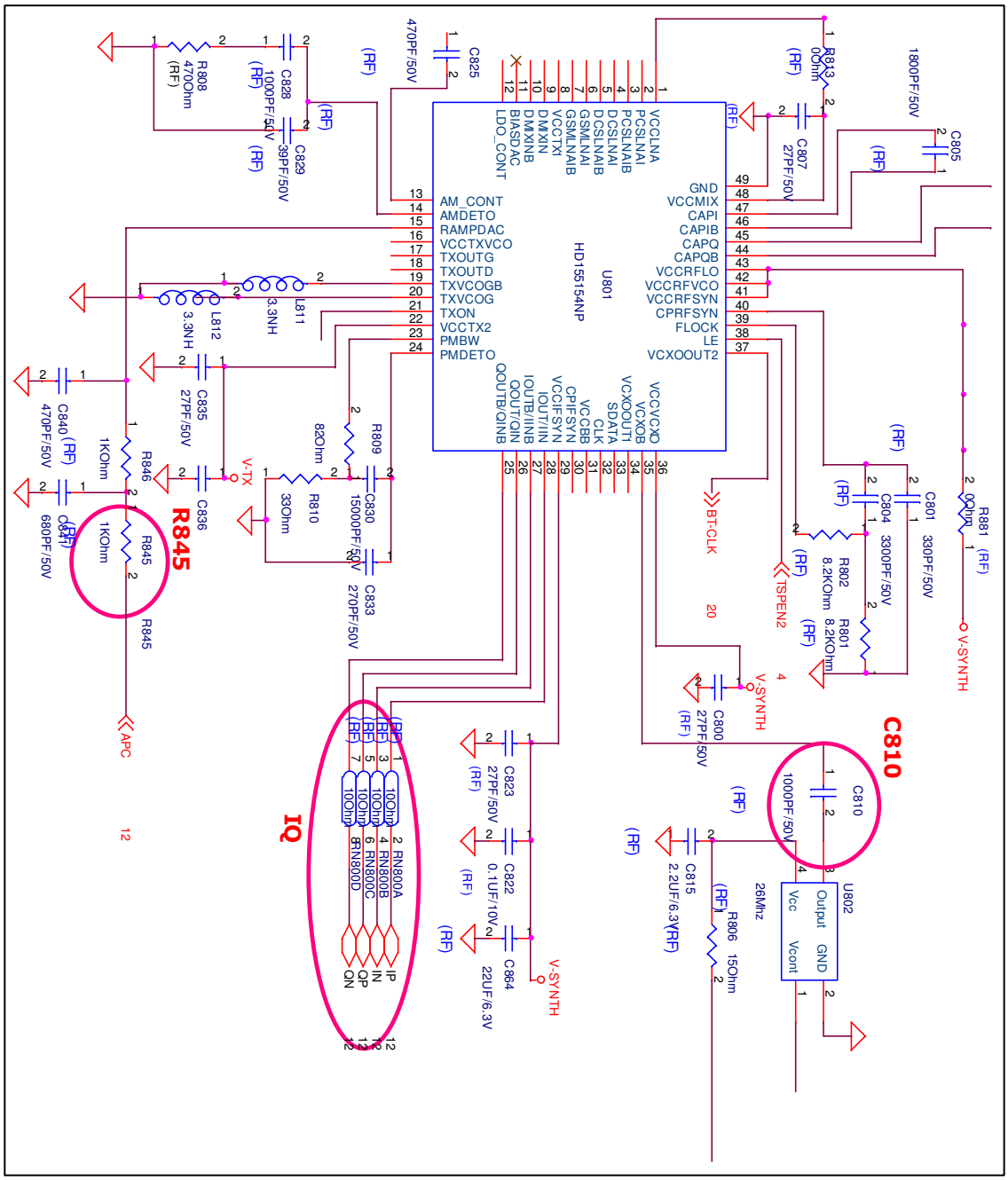




12.6 Power Amplifier (GSM and EDGE) part



12.7 Transceiver part

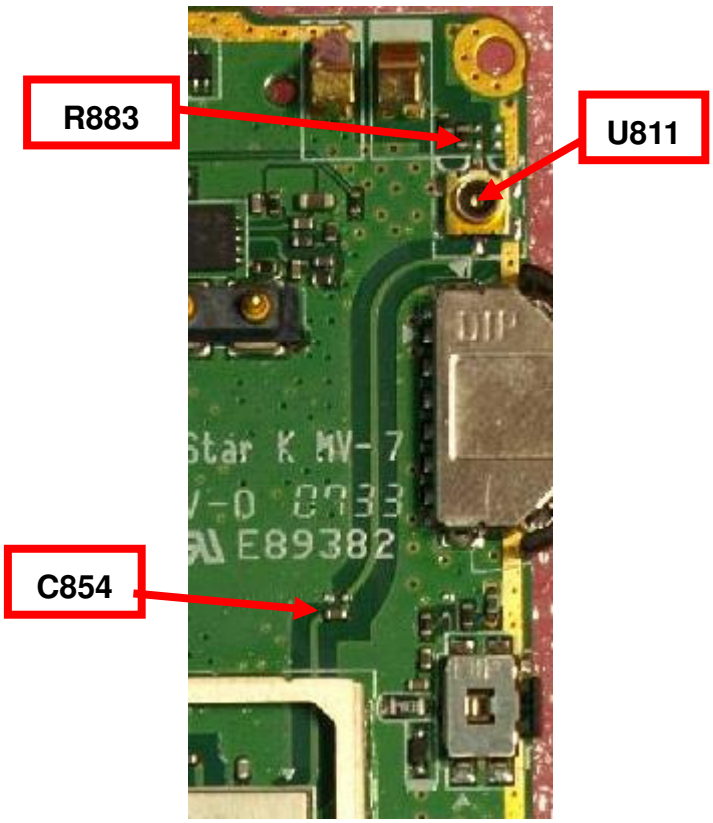


13. Mobile hardware testing

13.1 Front End (RF Switch)

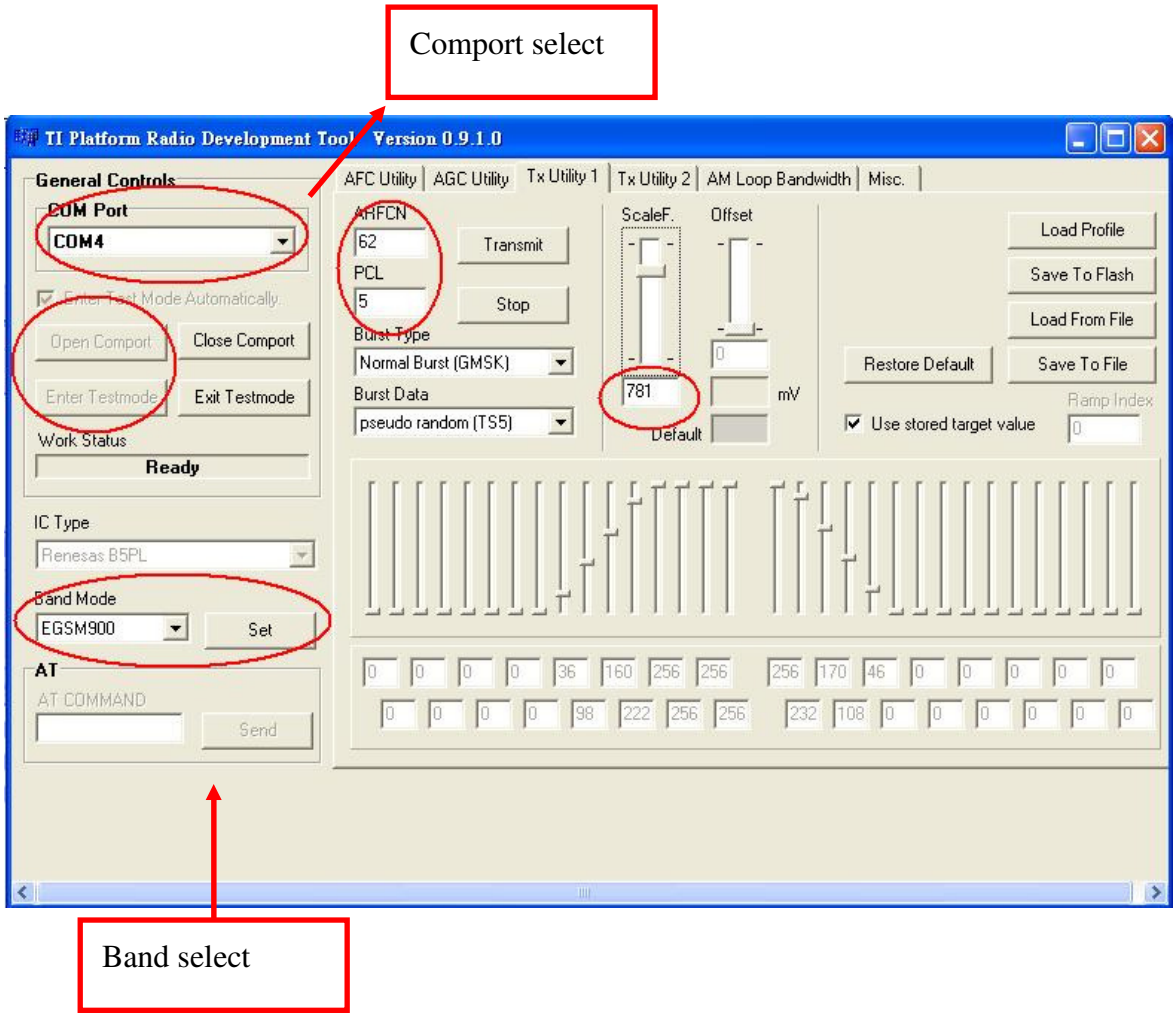
Include GSM antenna path and TX / RX path

GSM antenna Trace：To identify whether the GSM antaean trace is conducted or not, the conductivity between C854 and R883 should be measured with the Digital meter. If the conductivity between C854 and R883 is poor, it means the U811 (RF connector) is broken. Please replace this one with a new U811. After the replacement, please check the conductivity of the GSM antenna trace again.



TX trace of the front end module：Do this process with a PCB and Pegasus debug tool

Tool setting：



The setup of the Pegasus repair tool is as the above plots showing. Choose the right COM port, and press “Open Comport”. Tool will enter test mode automatically, if not, please press “Enter Test mode ”

There are two paths for TX, one is for 850/EGSM bands and the other is for DCS/PCS band.

Therefore, to check if these two traces work correctly, only the EGSM band and PCS band functions should be examined by the following steps.

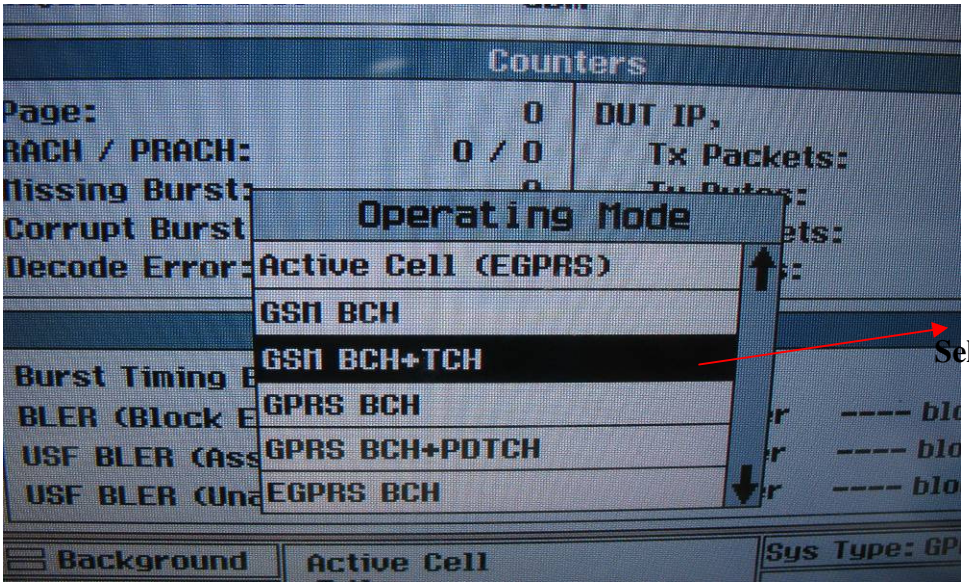
As for the setup for the EGSM band is : Channel : 975；DAC : 780.

The setup for the PCS band is：Channel : 512；DAC : 720.

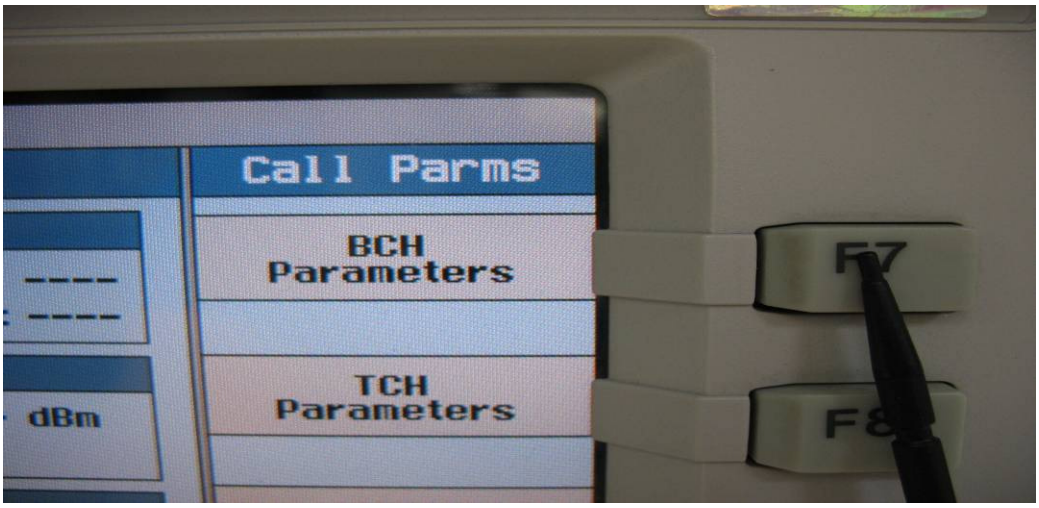
The setups of 8960 and 8820 are listed as the following pictures showing

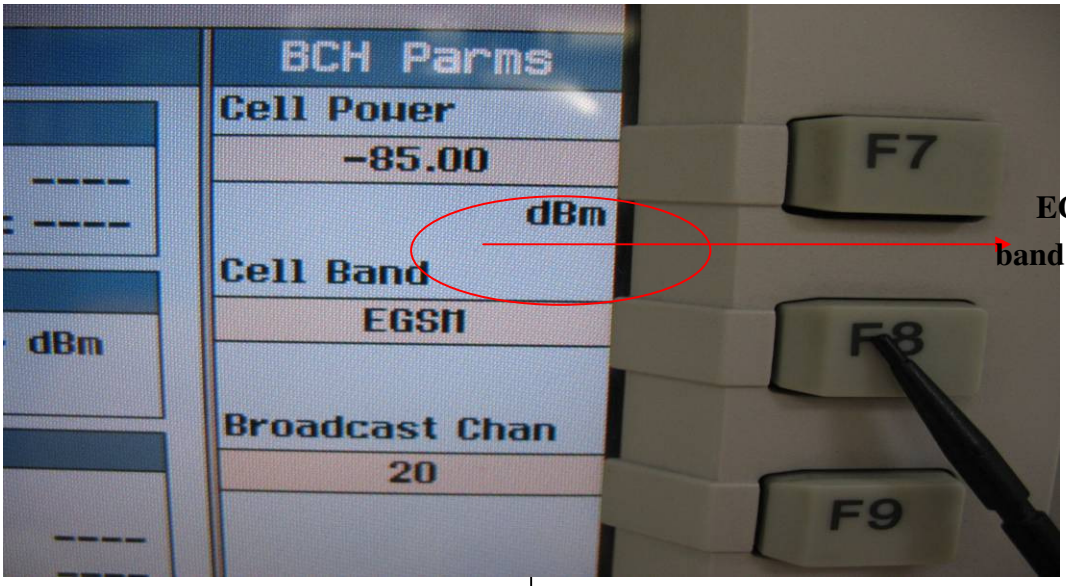
MEASUREMENT
CALL SETUP
SYSTEM CONFIG
CONTROL
MEASUREMENT RESET
Stop
START SINGLE
Reference set
CONTINUOUS ALL
DATA ENTRY
INCR SET

F1
F2
Control
Operating Mode
Active Cell
Connection Type
Auto
Originate Call
IMSI:
Called
Page:

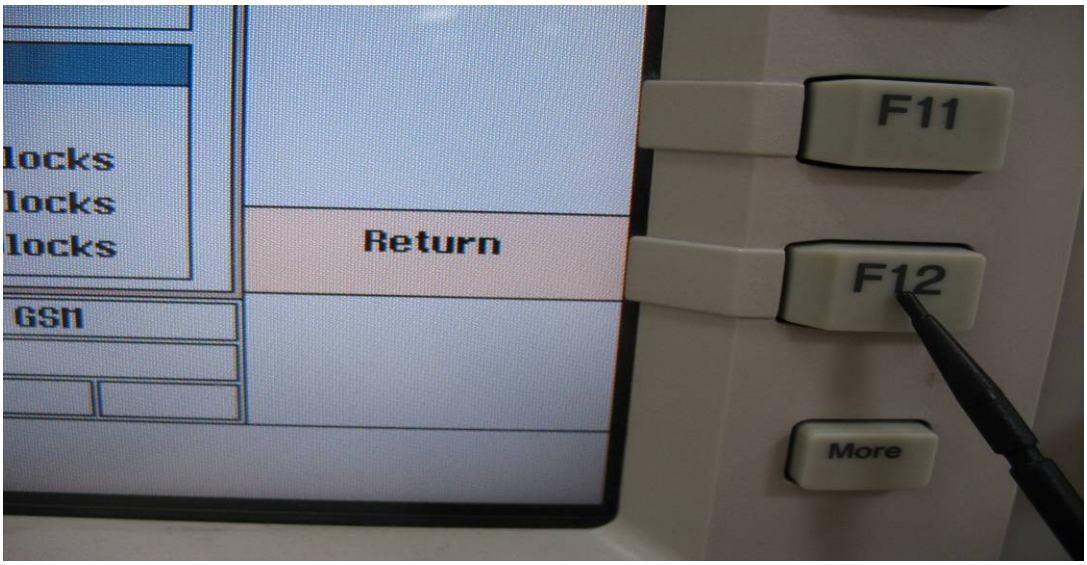

Counters
Page: 0
RACH / PRACH: 0 / 0
Missing Burst:
Corrupt Burst
Decode Error:
OUT IP,
Tx Packets:
Operating Mode
Active Cell (EGPRS)
GSM BCH
GSM BCH+TCH
GPRS BCH
GPRS BCH+PDTCH
EGPRS BCH
Burst Timing
BLER (Block
USF BLER (Ass
USF BLER (Una
Background
Active Cell
Sys Type: GP

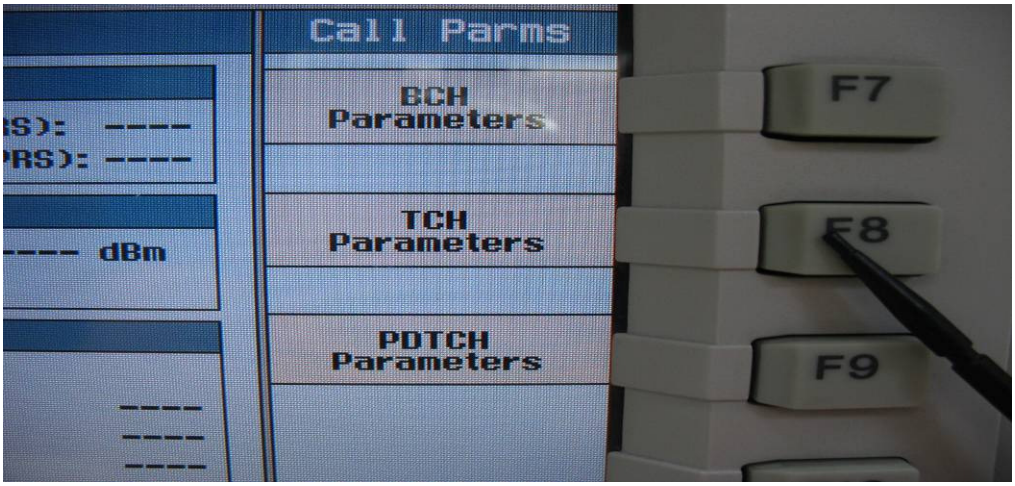
Select

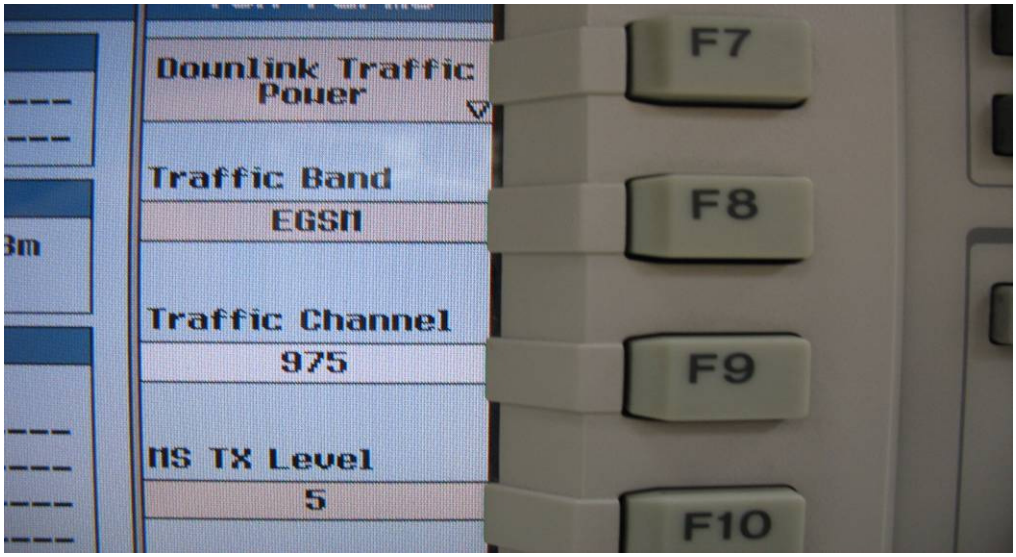




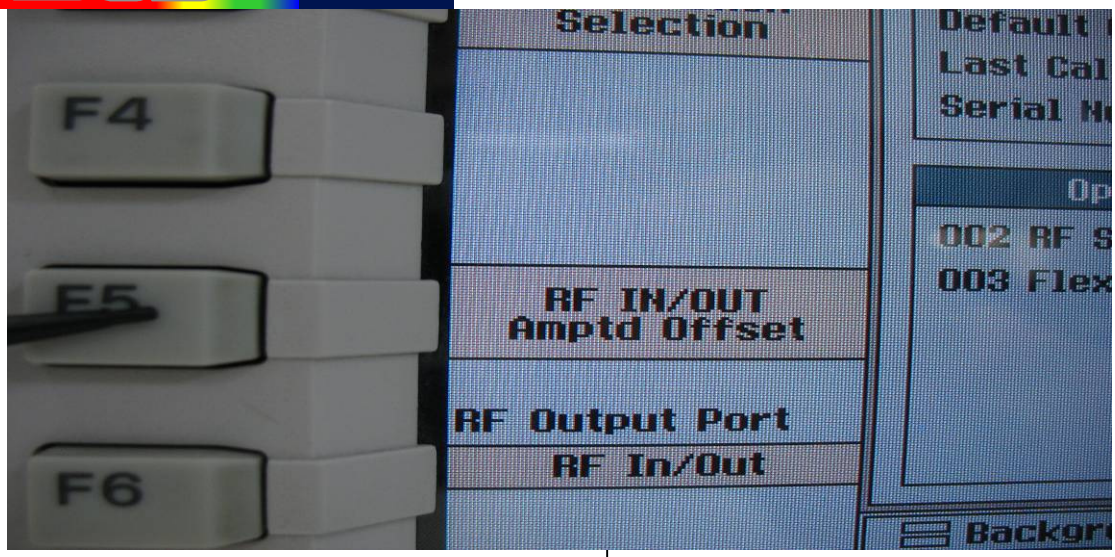
EGSM band select

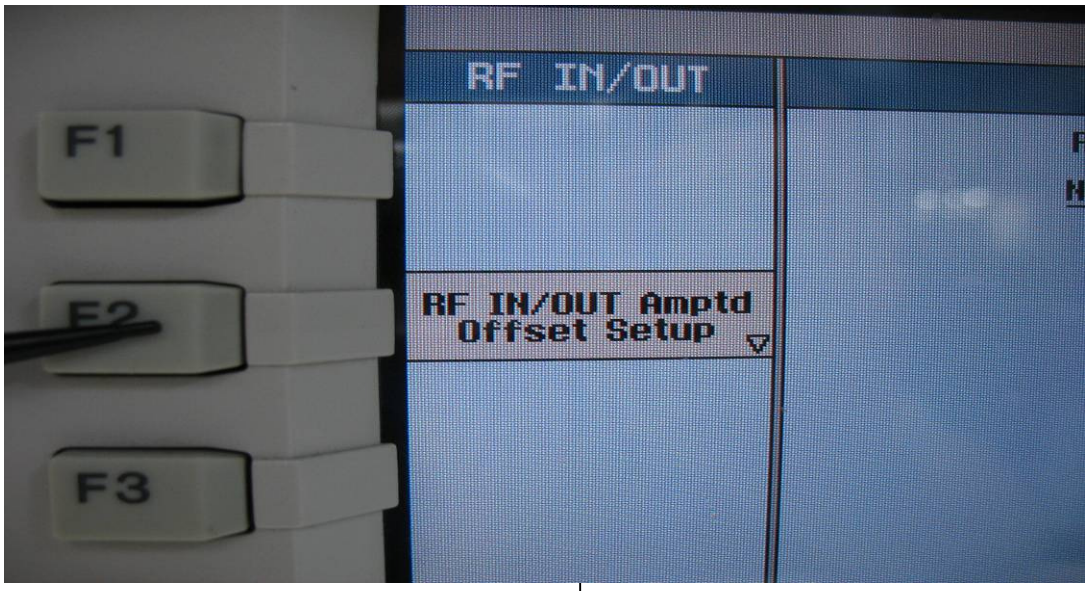


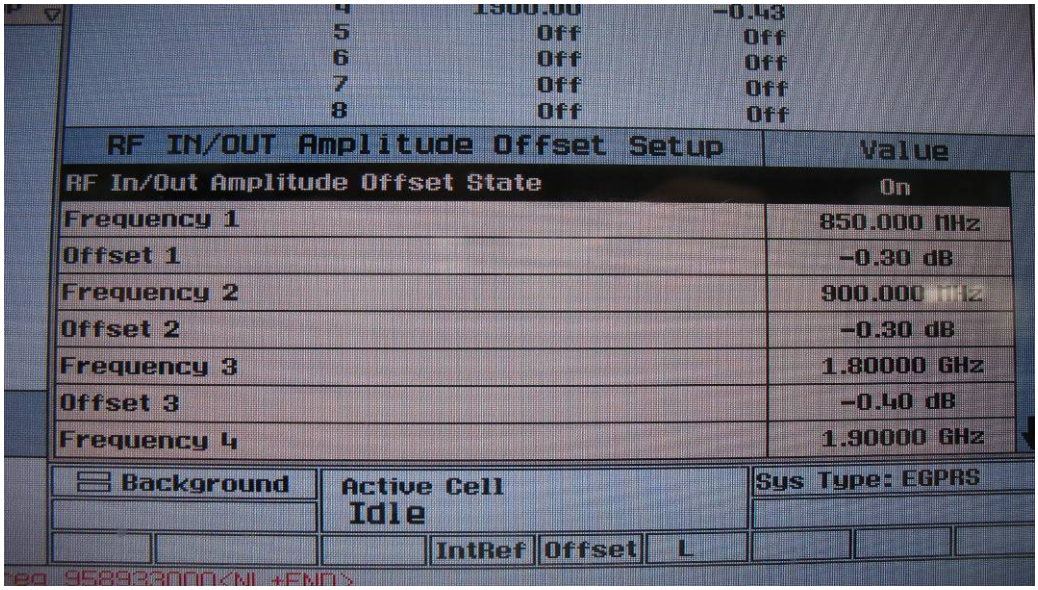


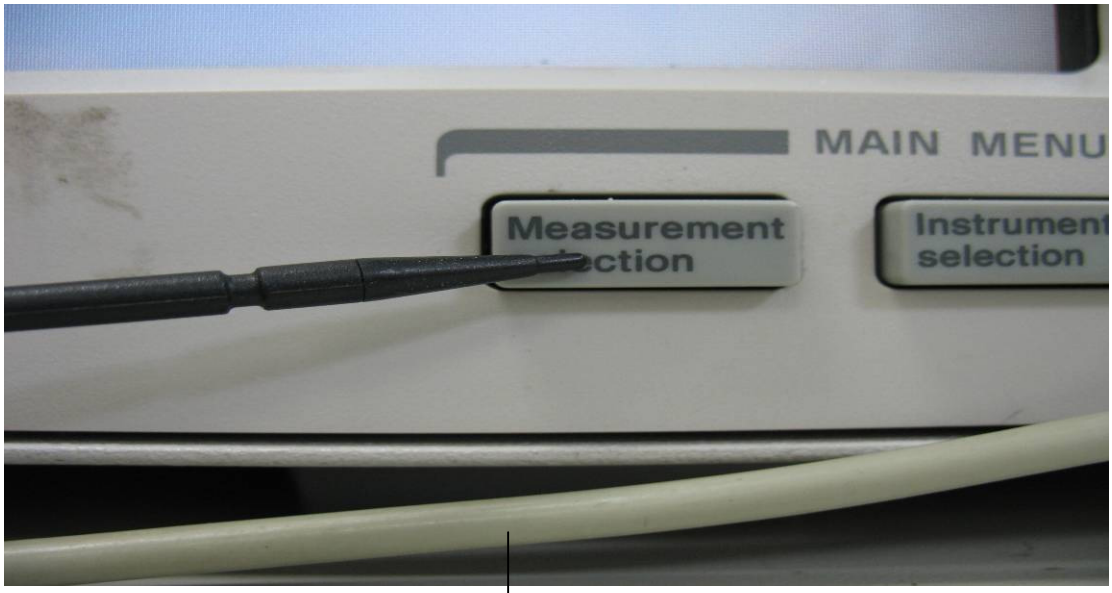


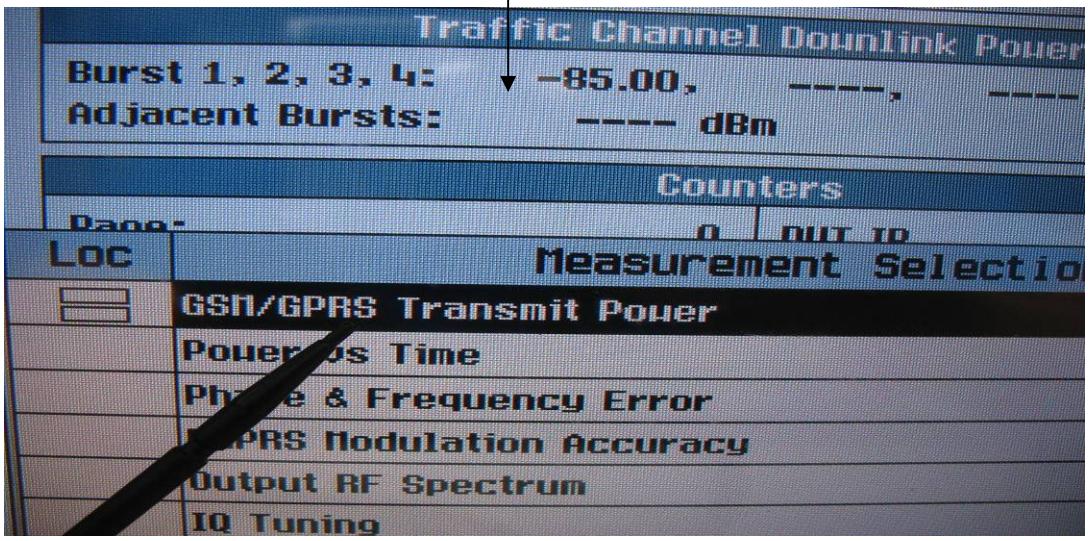
TCH band, channel and PCL selecting：GSM850 TCH128 PCL5, EGSM TCH975 PCL5DCS TCH512 PCL0, PCS TCH512 PCL0


Selection
F4
F5
F6
RF IN/OUT
Amptd Offset
RF Output Port
RF In/Out

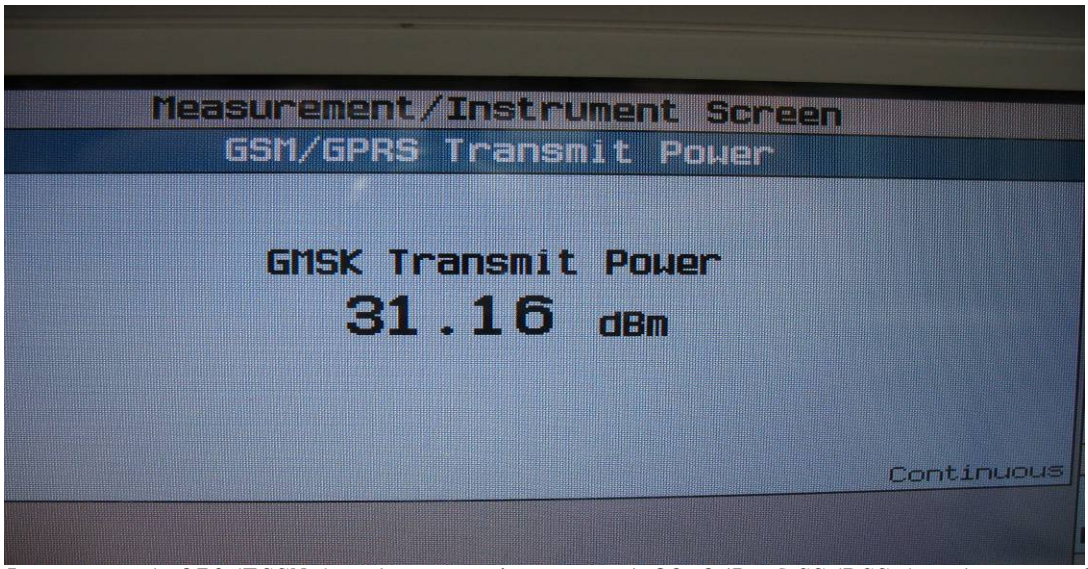

RF IN/OUT
F1
F2
F3
RF IN/OUT Amptd
Offset Setup


5 Off Off
6 Off Off
7 Off Off
8 Off Off
RF IN/OUT Amplitude Offset Setup
Value
RF In/Out Amplitude Offset State On
Frequency 1 850.000 MHz
Offset 1 -0.30 dB
Frequency 2 900.000 MHz
Offset 2 -0.30 dB
Frequency 3 1.80000 GHz
Offset 3 -0.40 dB
Frequency 4 1.90000 GHz
Background
Active Cell
Idle
Sys Type: EGPRS
IntRef
Offset
L


MAIN MENU
Measurement
Instrument
selection

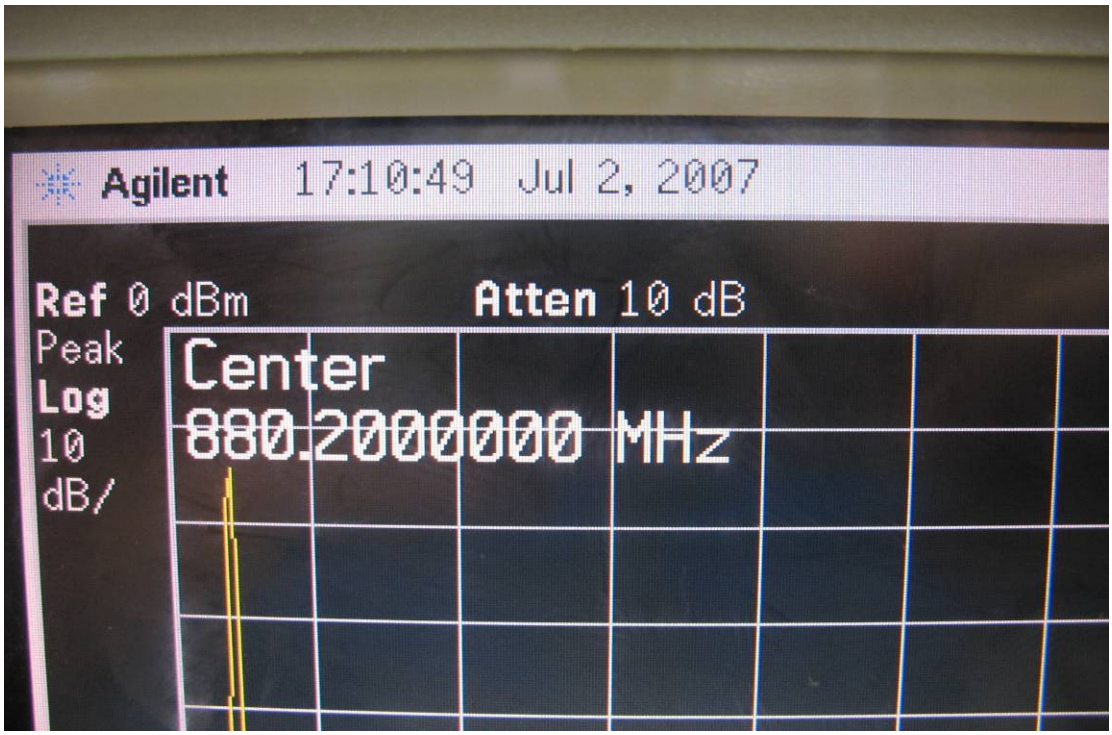

Traffic Channel Downlink Power
Burst 1, 2, 3, 4: -85.00, ----, ----
Adjacent Bursts: ---- dBm
Counters
LOC
Measurement Selection
GSM/GPRS Transmit Power
Frequency Error
Output RF Spectrum
IQ Tuning

RESET
SAVE
Stop
CALL SETUP
START
SINGLE
SAVE
SINGLE
Reference set
SYSTEM
CONFIG
CONTINUOUS
ALL
DELETE
DATA ENTRY
INCR
SET
7
8



In general, 850/EGSM band power is around 32.2dBm DCS/PCS band power is around 29.2dBm

After the setups for 8960, the semi-rigid with DC blocker and the Spectrum analyzer should be used to do the following measurements. The setup of the Spectrum analyzer are shown as below:


Agilent 17:10:49 Jul 2, 2007
Ref 0 dBm
Atten 10 dB
Peak
Log
10
dB/
Center
880.2000000 MHz

FREQUENCY
Channel
Input /
Output
SPAN
X Scale
View /
Trace
AMPLITUDE
Y Scale
Display
MEASURE
Meas
Setup

Peak
Log
10
dB/
Span
10.00000000 MHz

Save
Print
Marker
Peak Search
Marker

CONTROL
FREQUENCY Channel
Input / Output
MODE
SPAN X Scale
View / Trace
Det / Demod
Display
BW / Avg
Trig

50 MHz
3 dBm
Trace/View
Trace
1
2
3
Clear Write
Max Hold
Min Hold
View

FREQUENCY
Channel
Input /
Output
MODE
SPAN
X Scale
View /
Trace
Det /
Demod
AMPLITUDE
Display
BW /
Avg
MEASURE
Meas
Setup
Singie
MEASURE
Restart
Meas
Control

ESC
Amplitude
Ref Level
0.00 dBm
Auto
Man

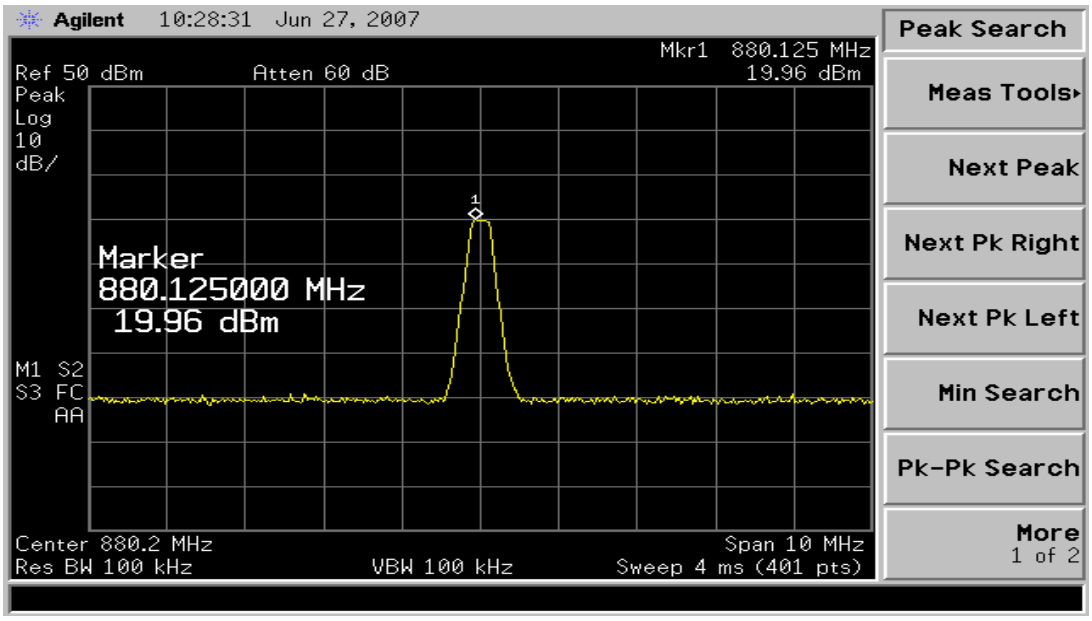
Agilent
17:13:38
Jul 2, 2007
Ref 50 dBm
Atten 60 dB
Mkr1
Peak
Log
10
dB/
Ref Level
50.00 dBm

If the Ref level requirement is not 50 dBm, it would be remarked.

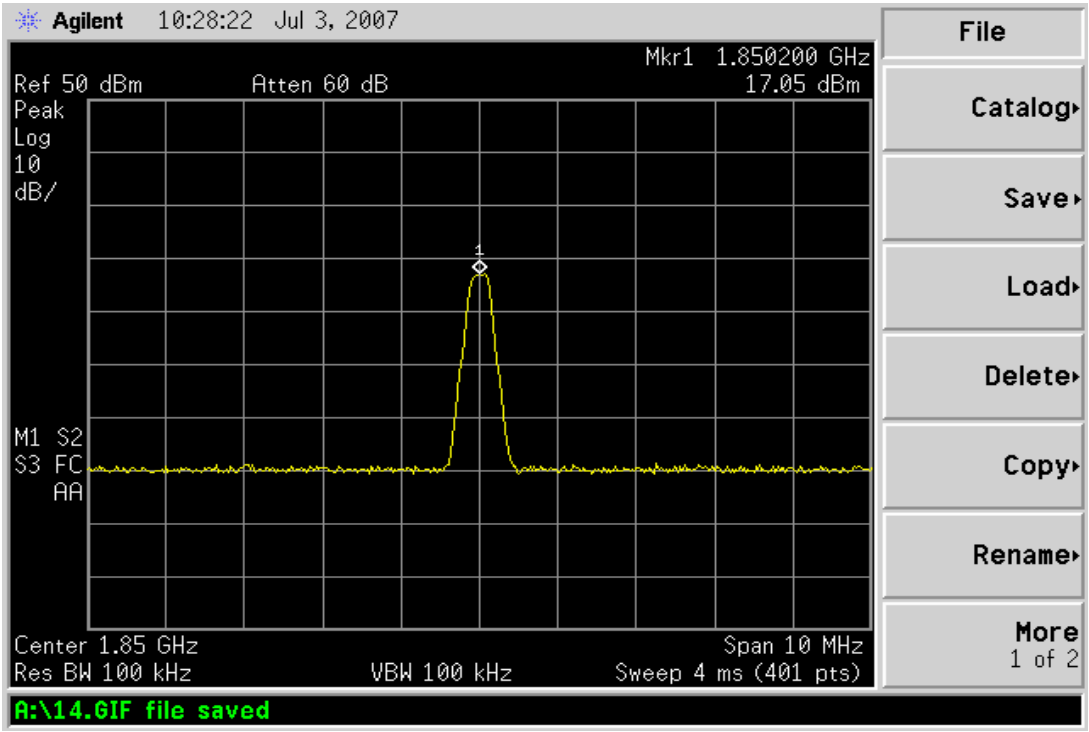
Test Point: C854

Purpose： To make sure the RF signal from FEM (U800) is correct. The TX power get from probe would be 8~12dB degrade.

EGSM band measurement result



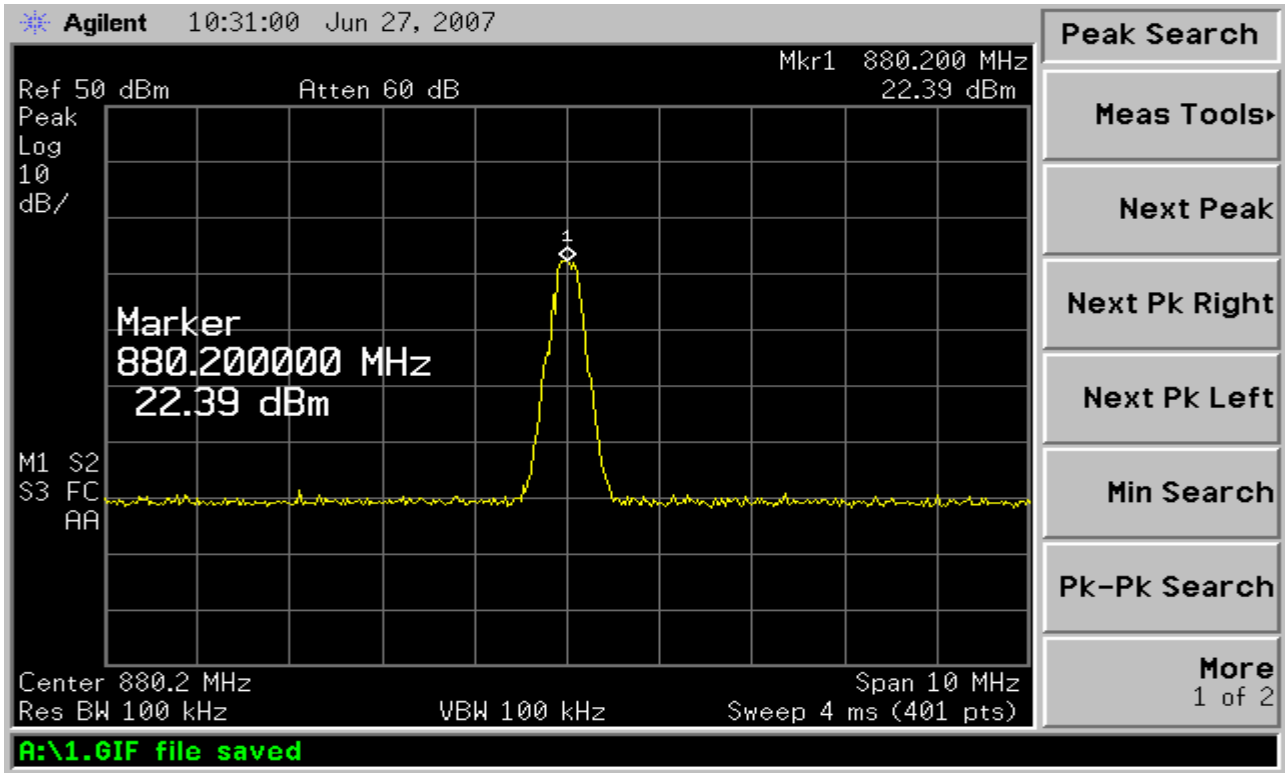
PCS band measurement result



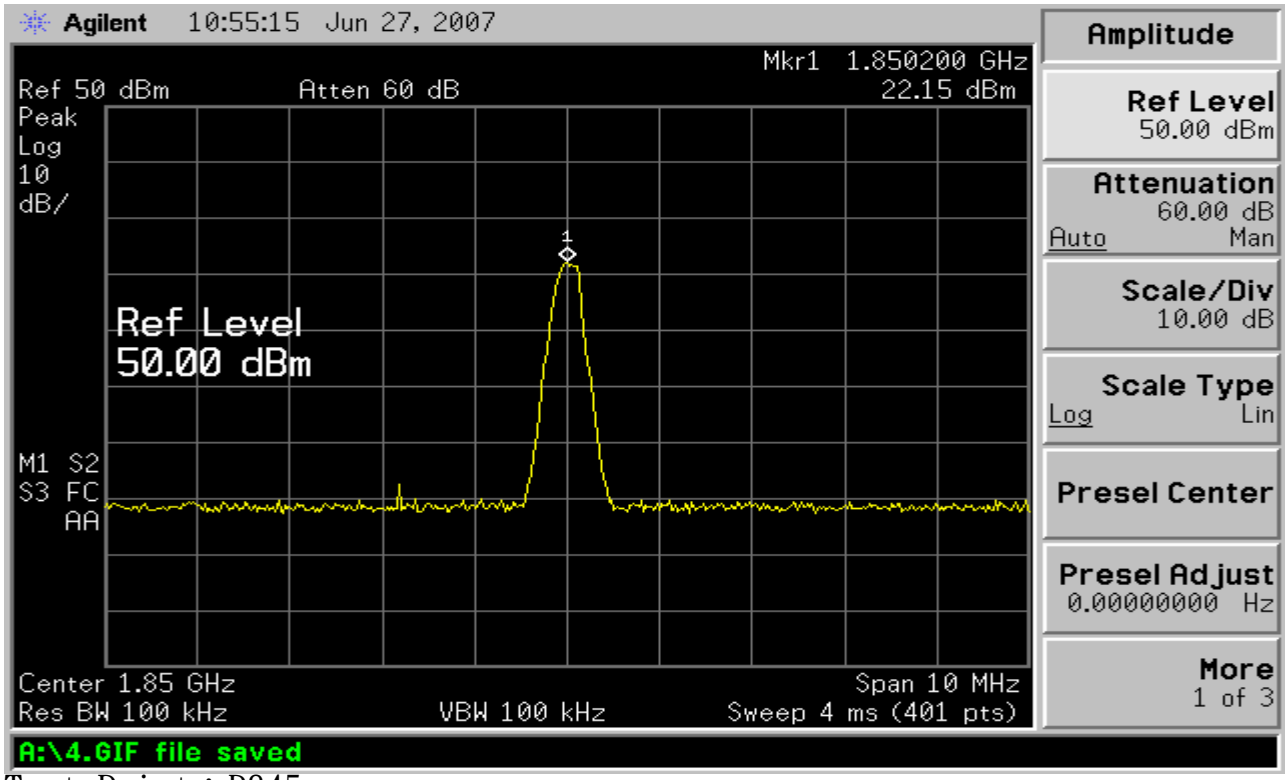
Test Point: C857 for 850 & EGSM band；C858 for DCS & PCS.

Purpose：To make sure TX power from PA(U807) to FEM(U800) is correct.

EGSM band measurement result



PCS band measurement result

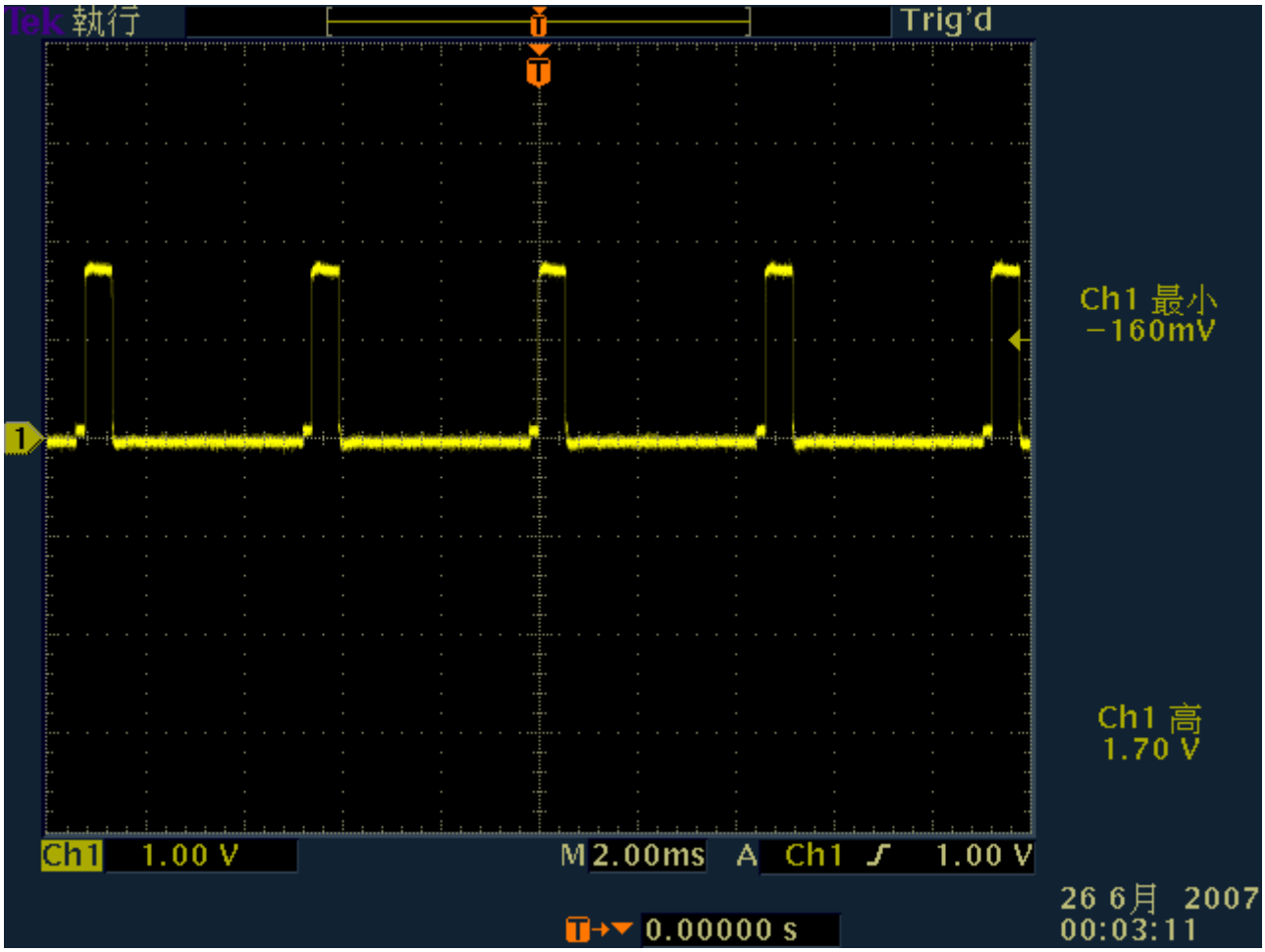


Test Point：R845

Purpose：To make sure the RF control signal from E-syren (U17) to Transceiver (U801) is correct.

Use oscilloscope to check this part, and the amplitude would be 1.5~1.8V due to different DAC value.

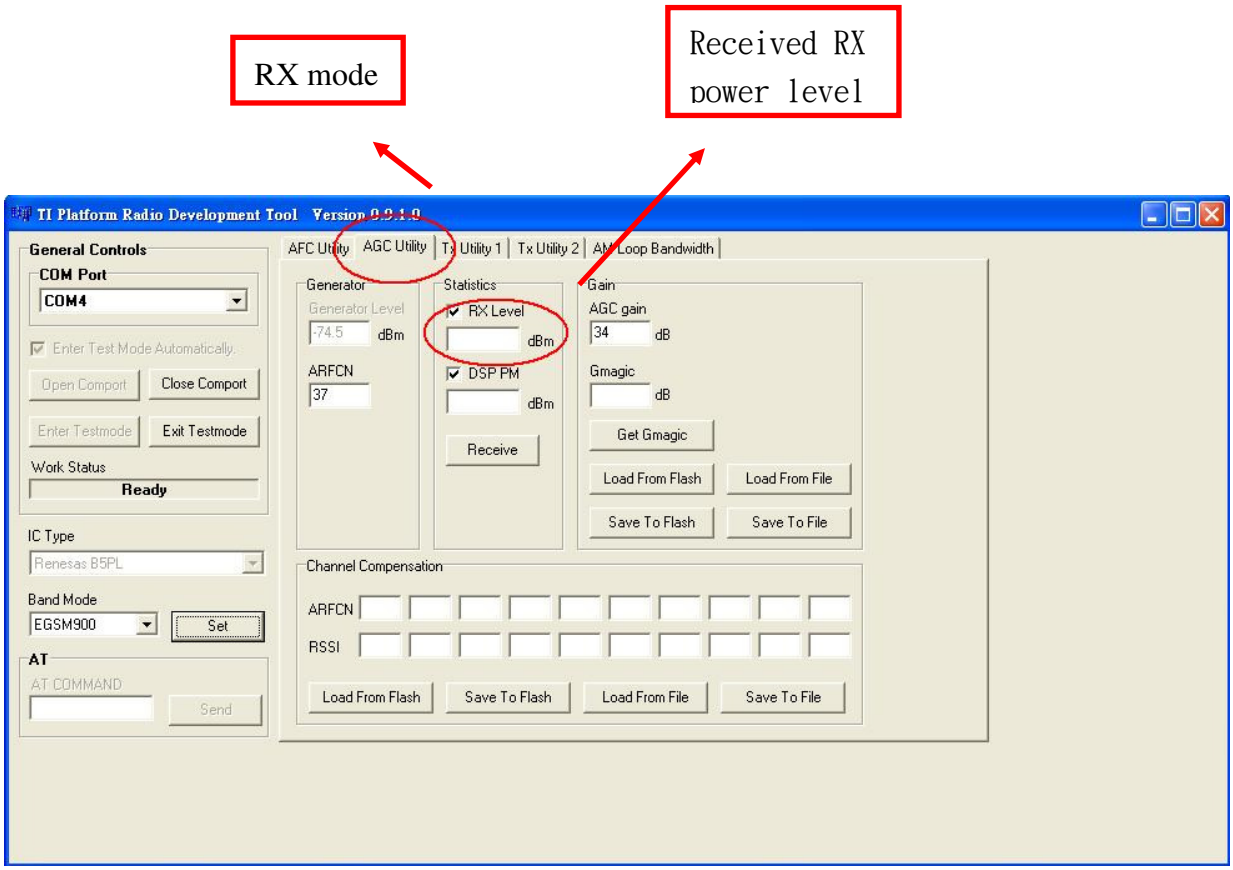
Measurement result



13.2 Rx trace

Check with Pegasus A debug tool. The reference level of the spectrum analyzer should be -30dBm. As for other setups, is the same as TX Part.

Repair tool setting：



The setup of the Pegasus A debug tool is as the above plots showing.

There are three traces for the GSM and Edge functions.

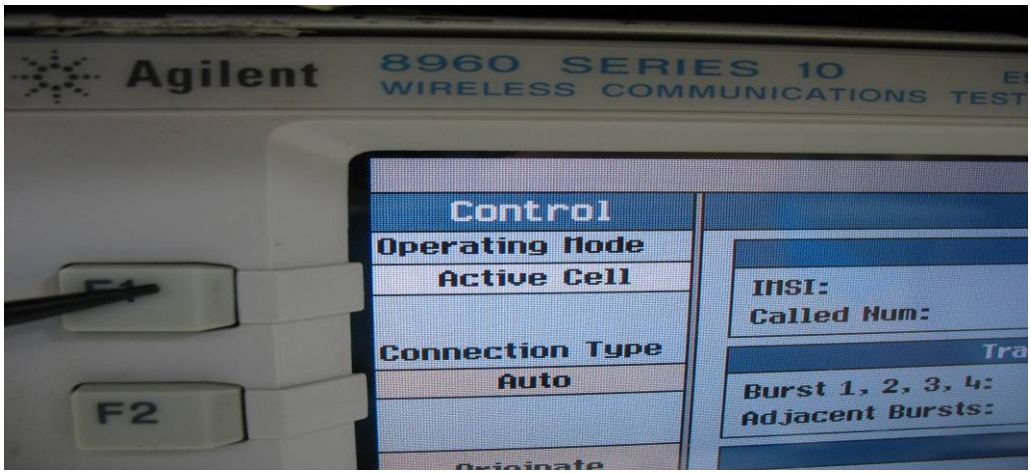
One is for 850/EGSM bands, another is for DCS band and the other is for PCS band.

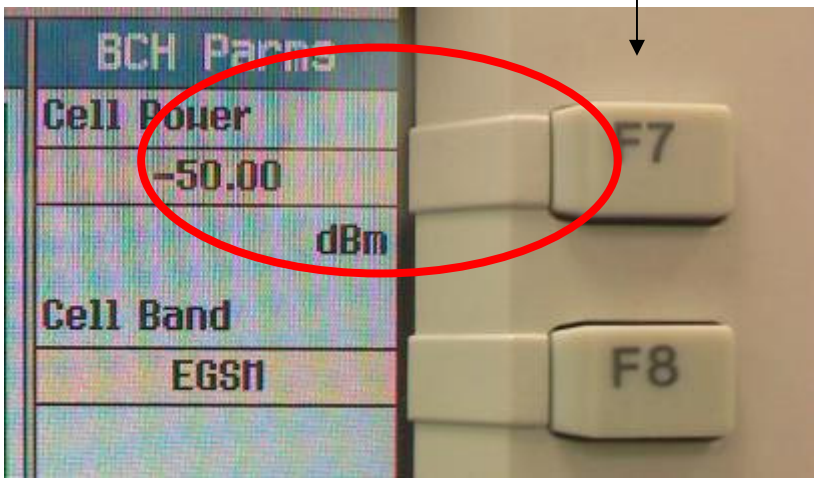
Therefore, to check if the three traces work correctly, the EGSM band,DCS band and PCS band functions should be examined by the following steps.

As for the setup for the EGSM band is Channel : 975, DCS band Channel : 512 and PCS band Channel : 512.

The setups of 8960 and 8820 are listed as the following pictures showing.

8960 Rx test setup





Set Cell Power = -50dBm in the wanted BCH.

Set TCH=190 for 850 band, TCH=62 for EGSM band,

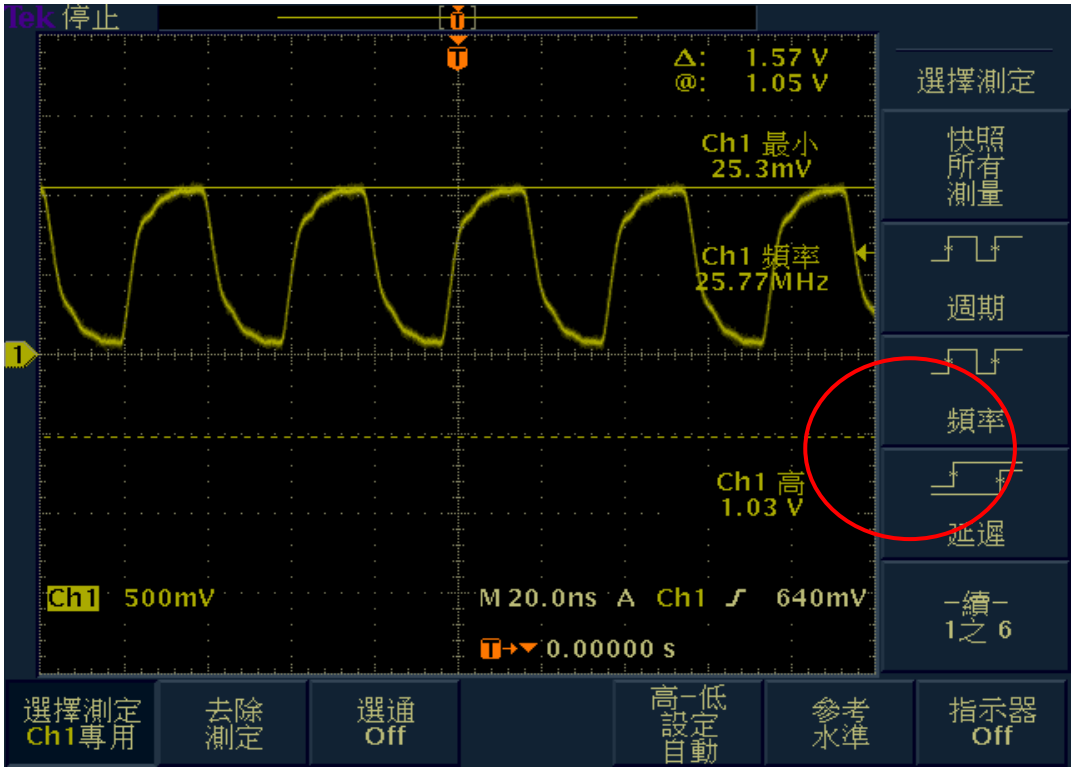
Check the setup is correct.

Then press “Receive” in the Pegasus A debug tool.

We could read the power which P527 gets from 8960.

Test Point：C810

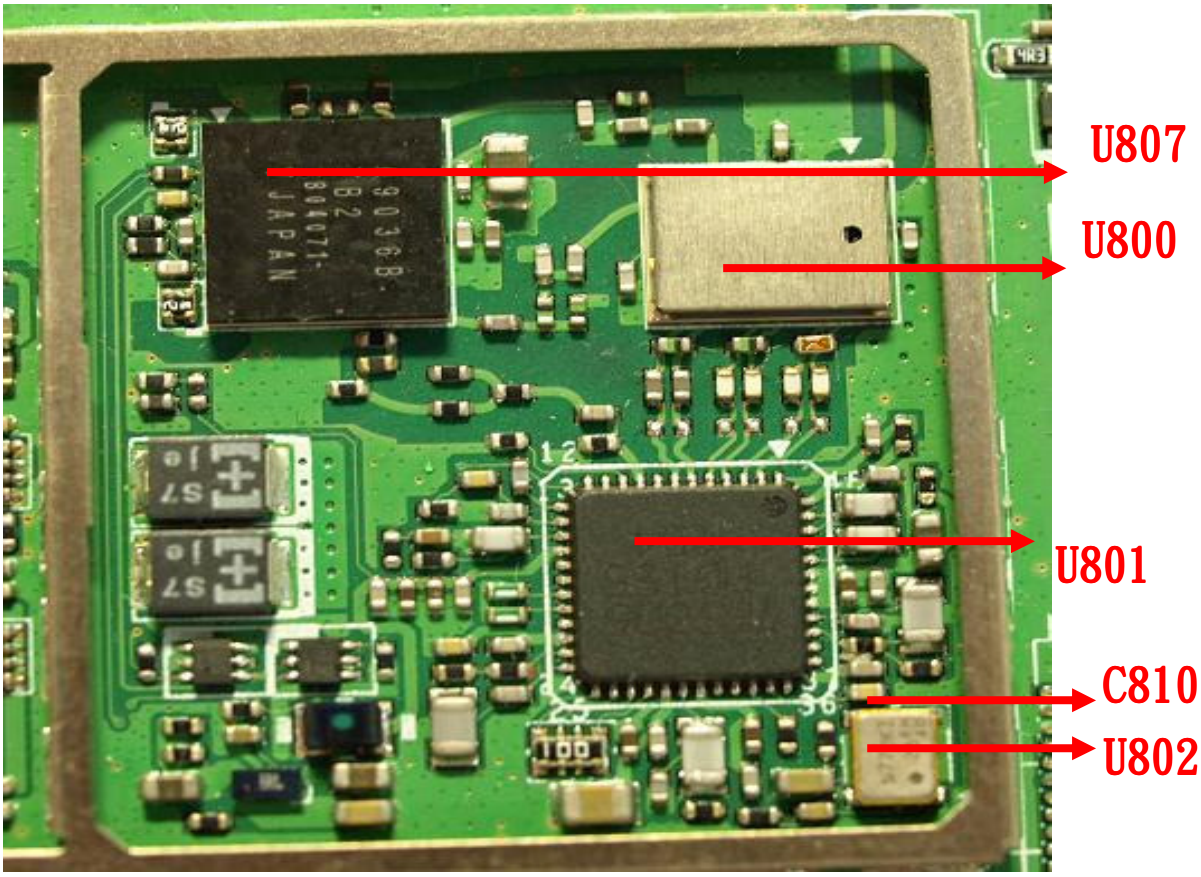
Purpose：To make sure 26MHz signal is correct. Please check this case by Oscilloscope.



14. RF Board level trouble shooting

14.1 The PCB could not boot

Check C810 by the oscilloscope to confirm 26MHz signal is correct or not. If the 26MHz signal is not correct, re-heat or change U802.



AGC-Gmagic out of limit & AGC RSSI out of limit, these two items mean there is a problem at the RX path.

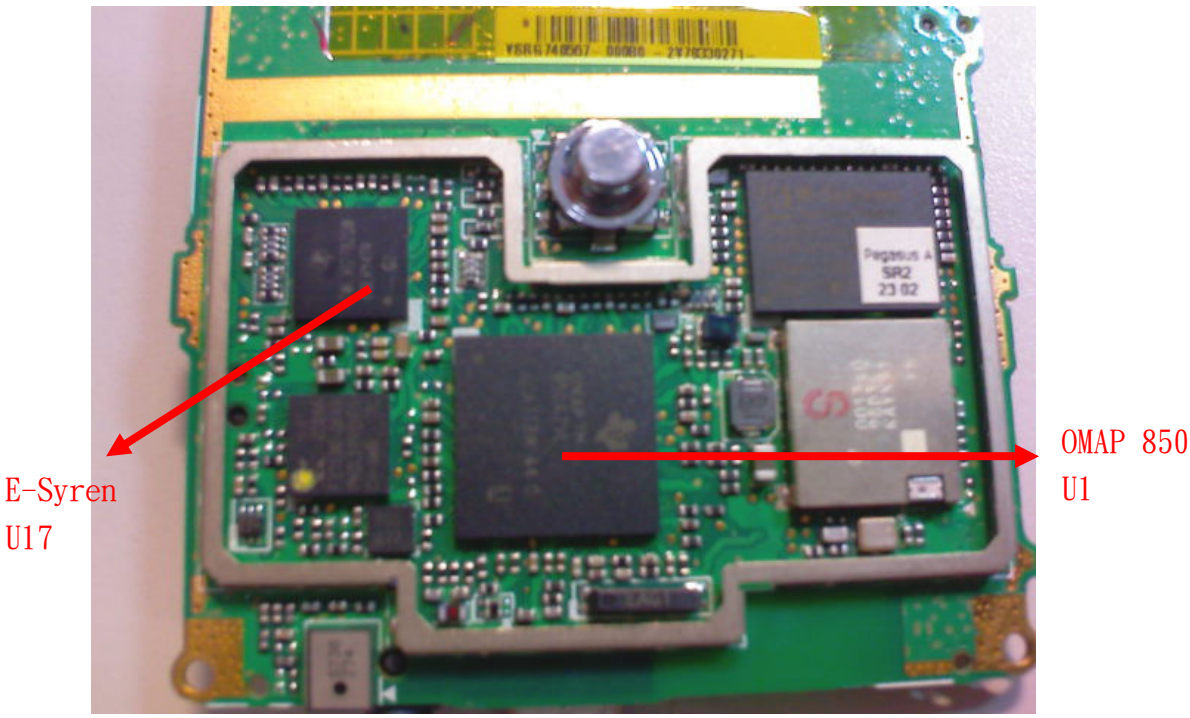
Please set up RX path test environment.

Please check RX path with P527 debug tool. We could see the received power level.

If the received power is above or under 1dBm than 8960, change FEM(U800).

14.2 GSM APC fail

- Please set up Tx path test environment.
- Please check test point C854 with P527 debug tool and spectrum analyzer. If the result is different, change U800.
- Please check test point C857 or C858 with P527 debug tool and spectrum analyzer. If the result is different, change U807.
- Please check R845 with P527 debug tool and oscilloscope. If the result is different, change E-syren(U17). If the result is correct, change transceiver (U801).

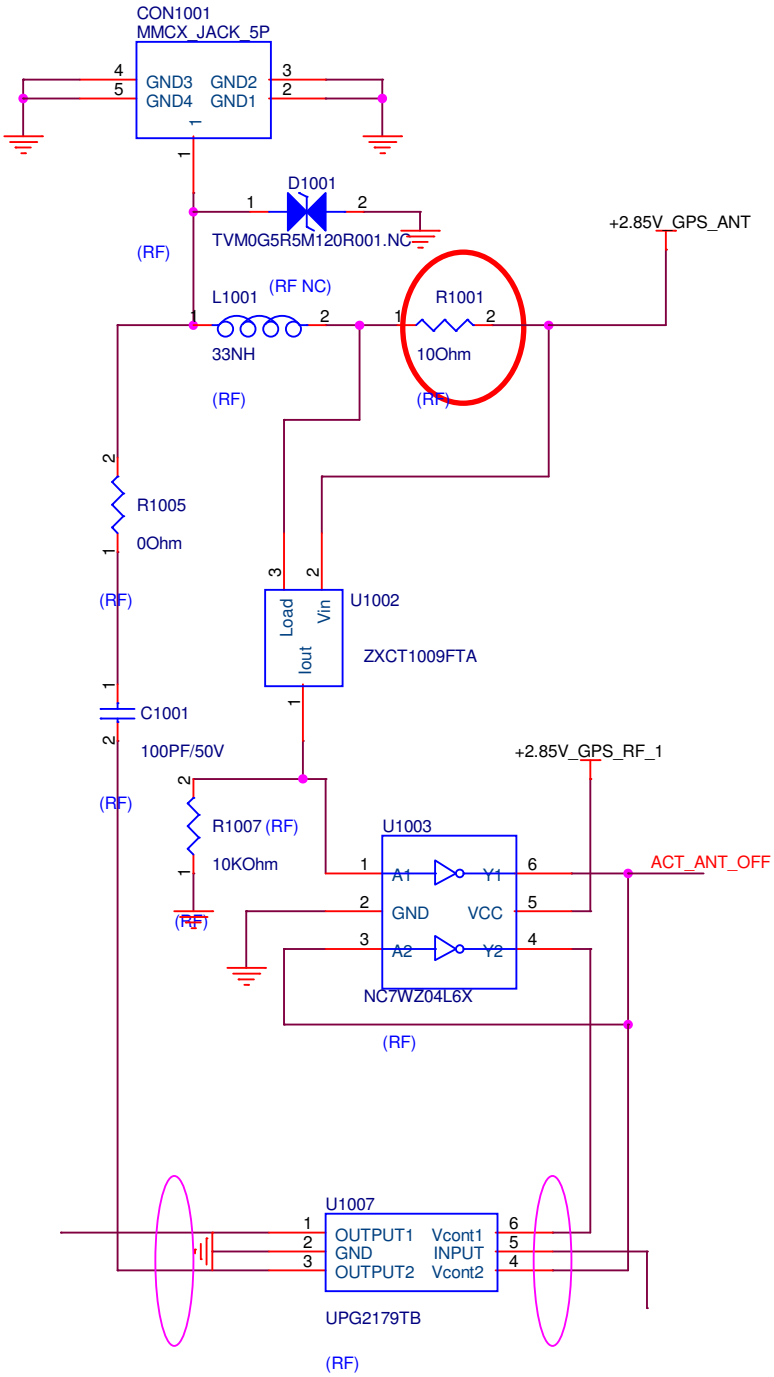


14.3 AFC fail

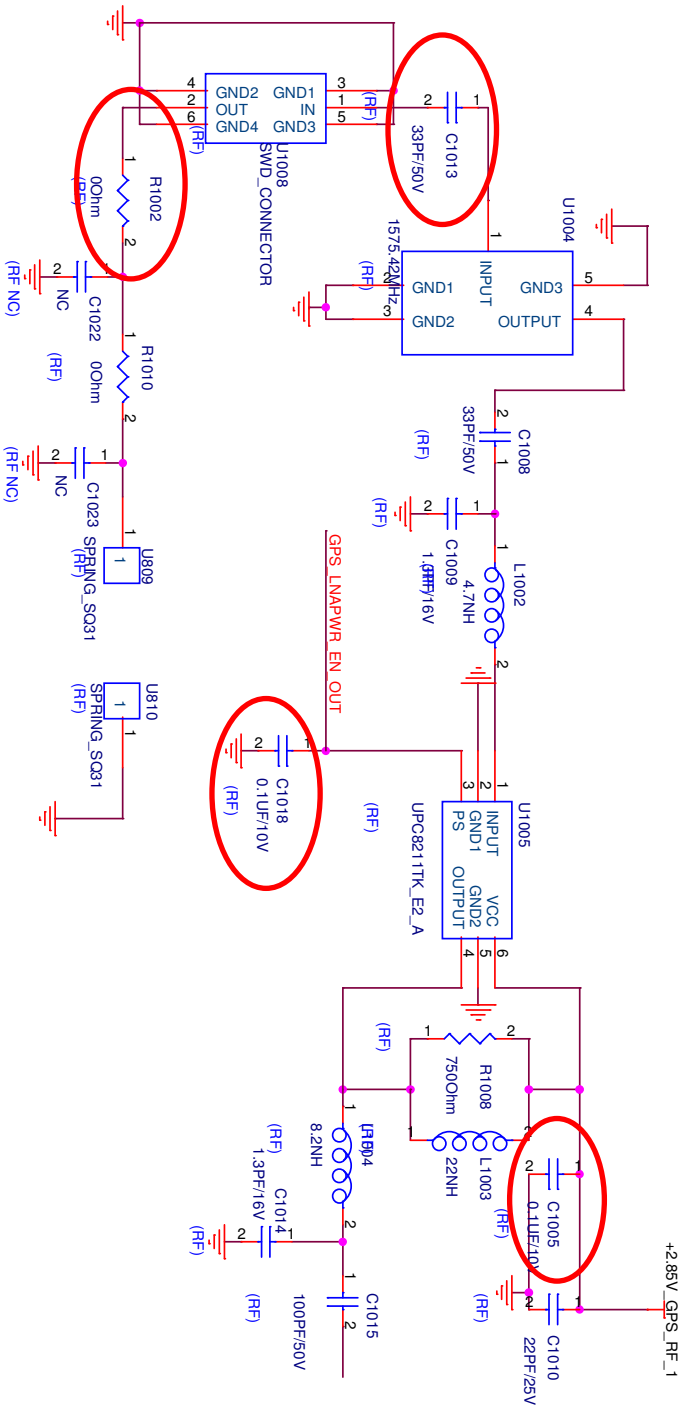
- Please check APC is correct or not.
- If APC fail, follow the GSM APC fail check step to debug.
- If APC pass, change U802.

15. GPS Test Points

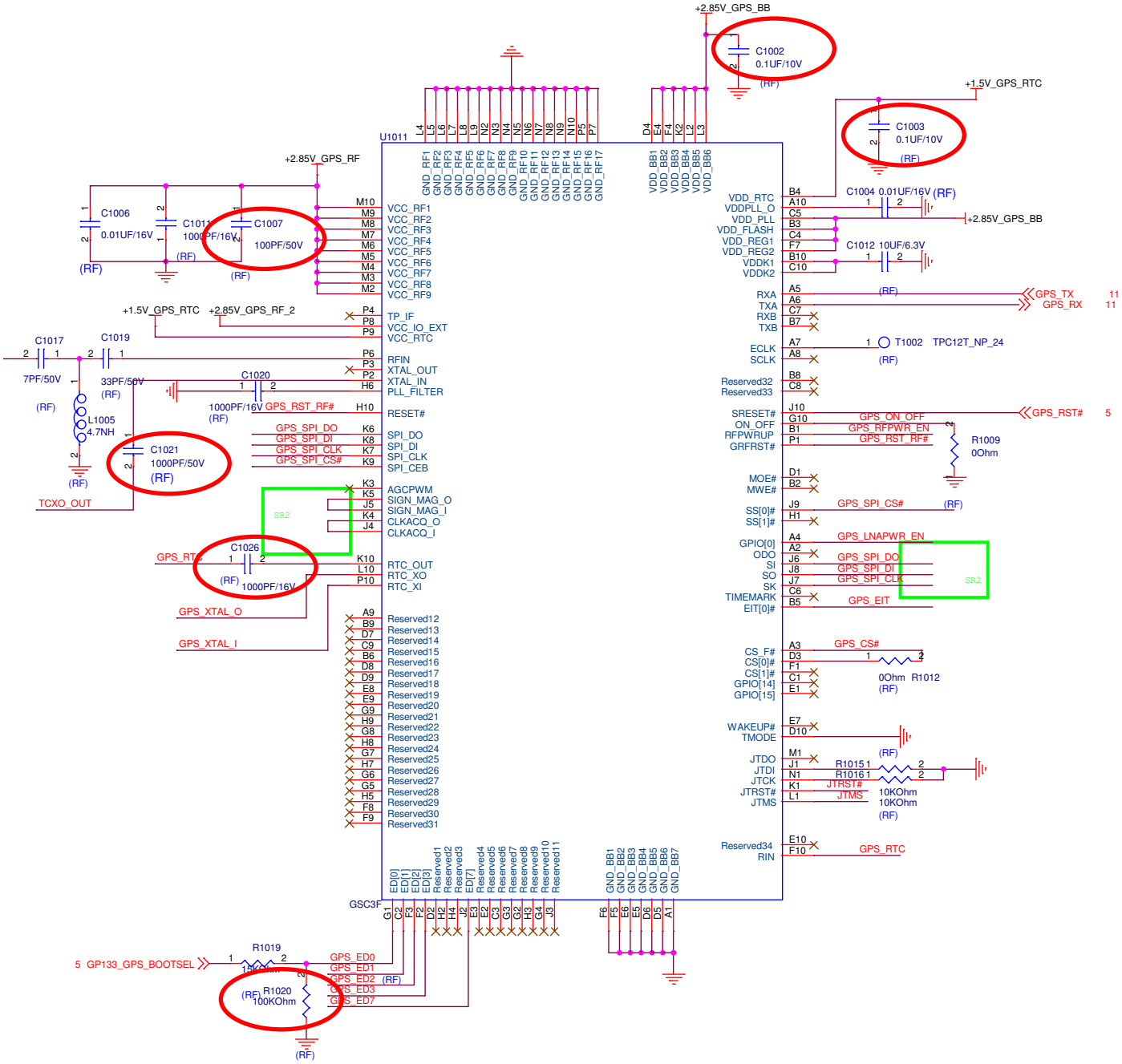
15.1 Active Path test point



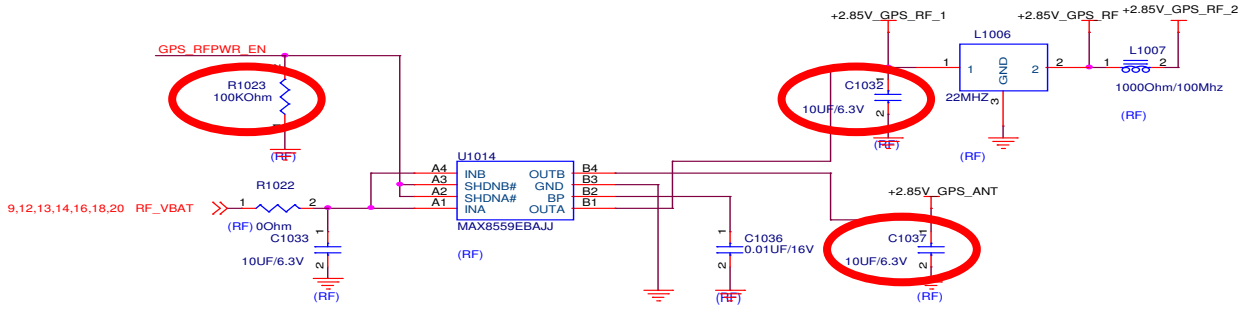
15.2 Passive Path test point

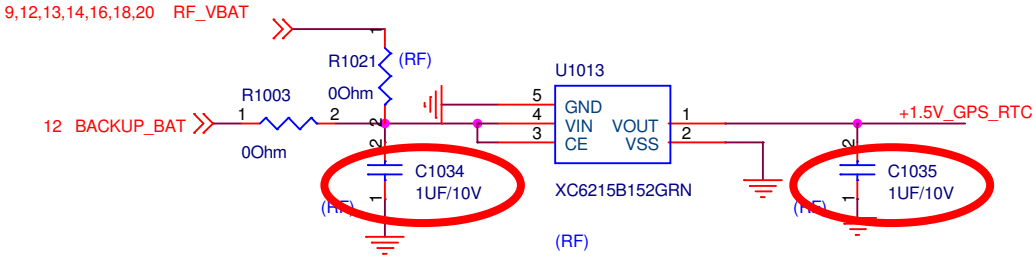


15.3 SiRF StarIII test point

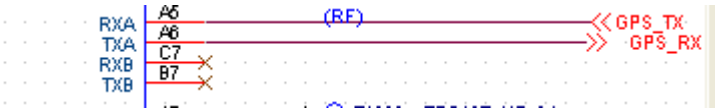


15.4 Power part test points



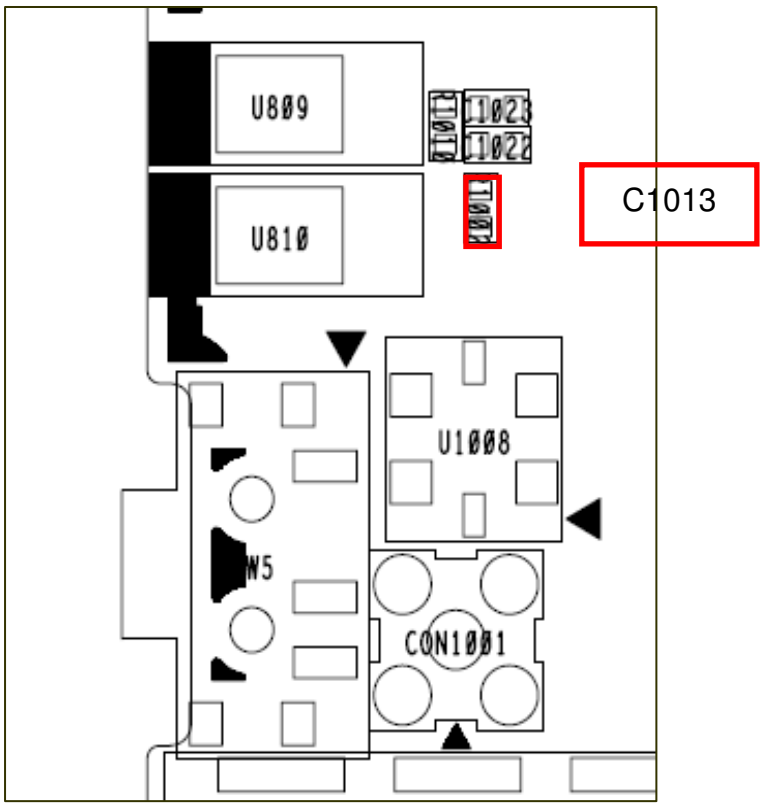


Testing signal from baseband

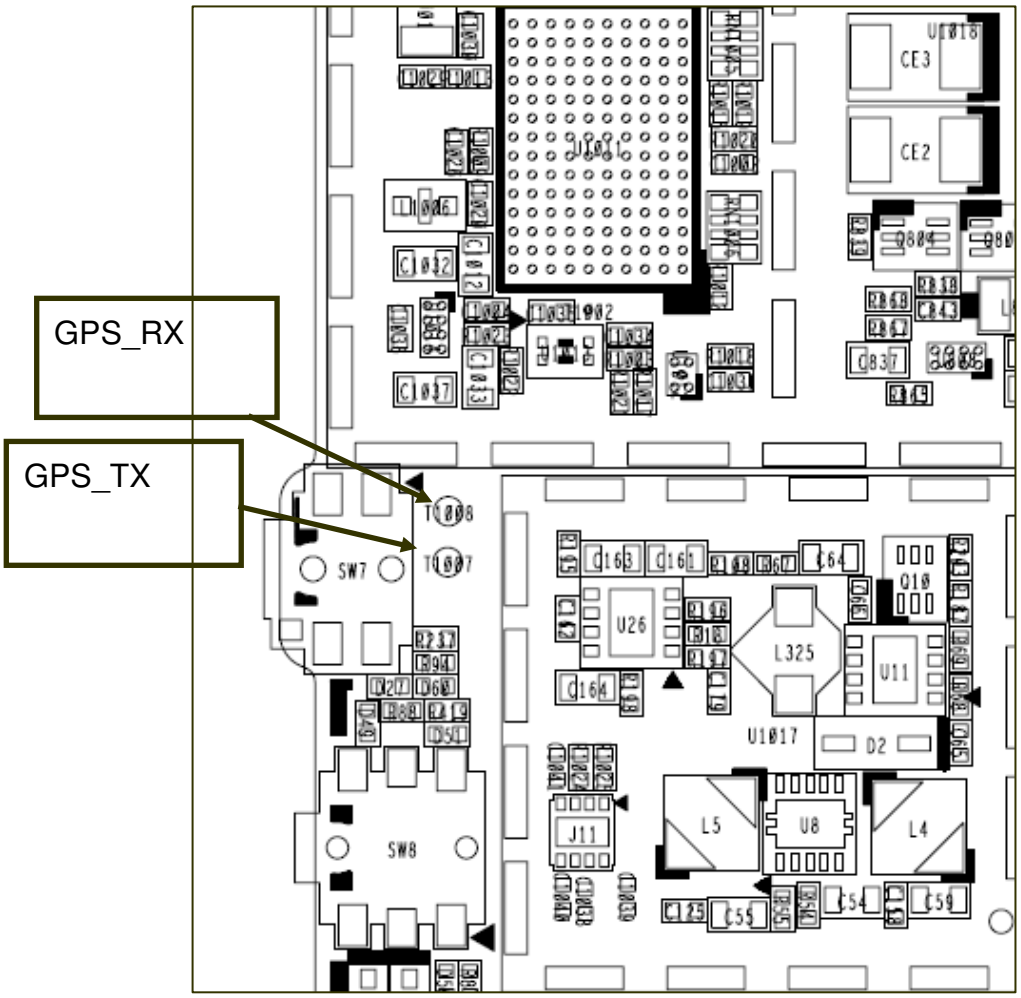


16. Component Placement

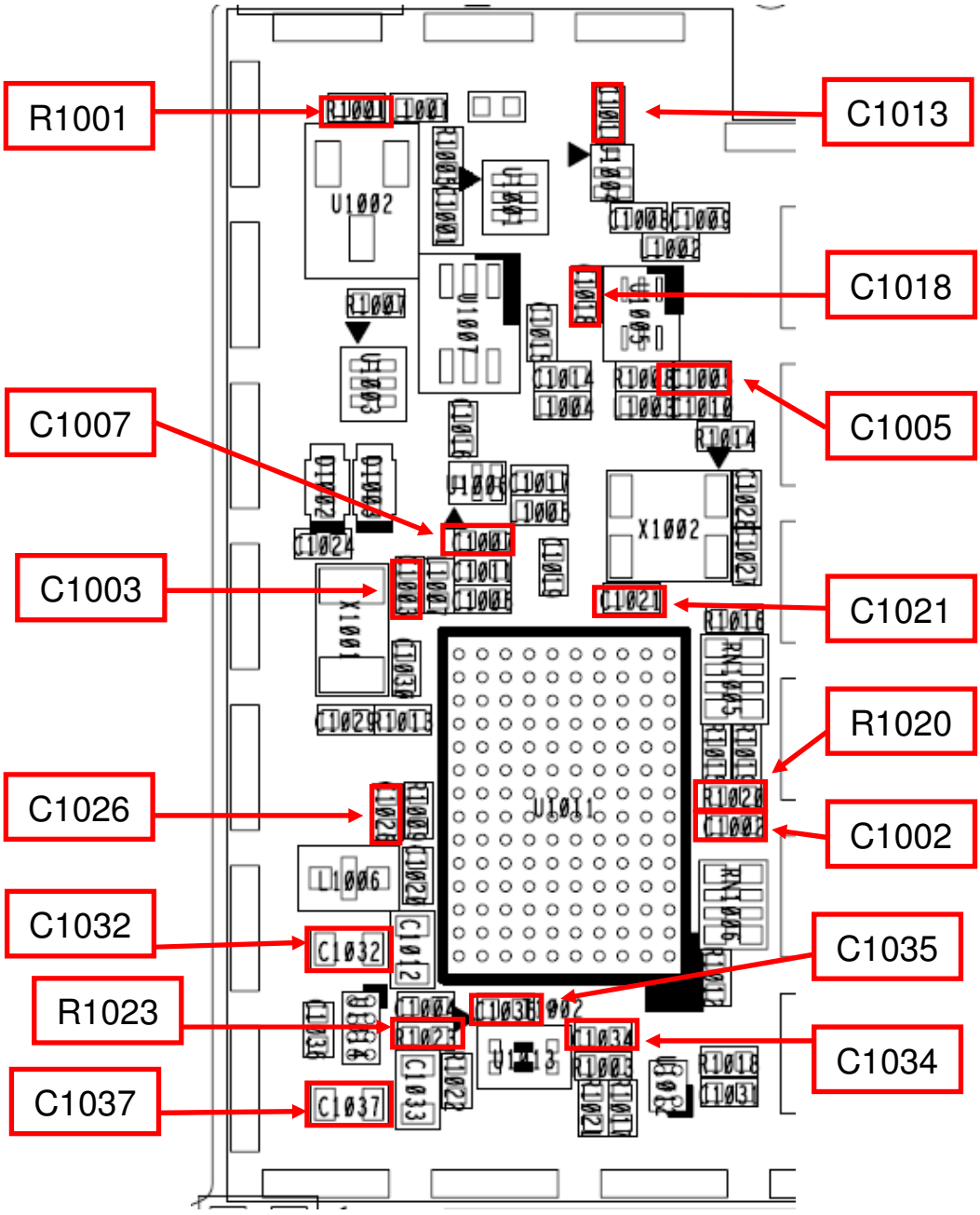
16.1 GPS Antenna



16.2 Testing signal Point

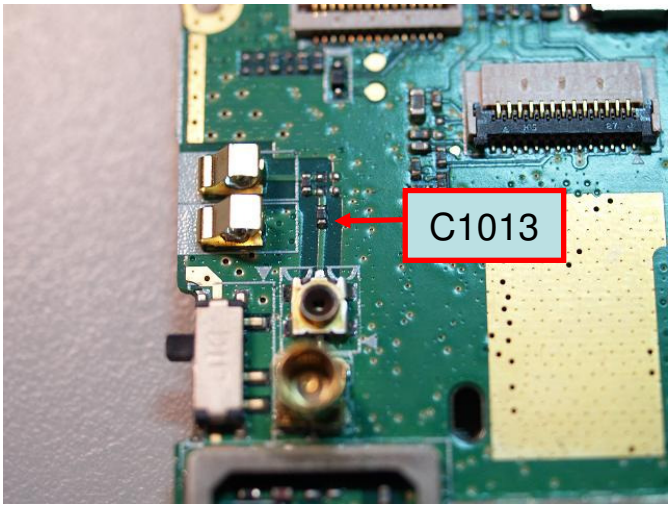


16.3 GPS Function Block

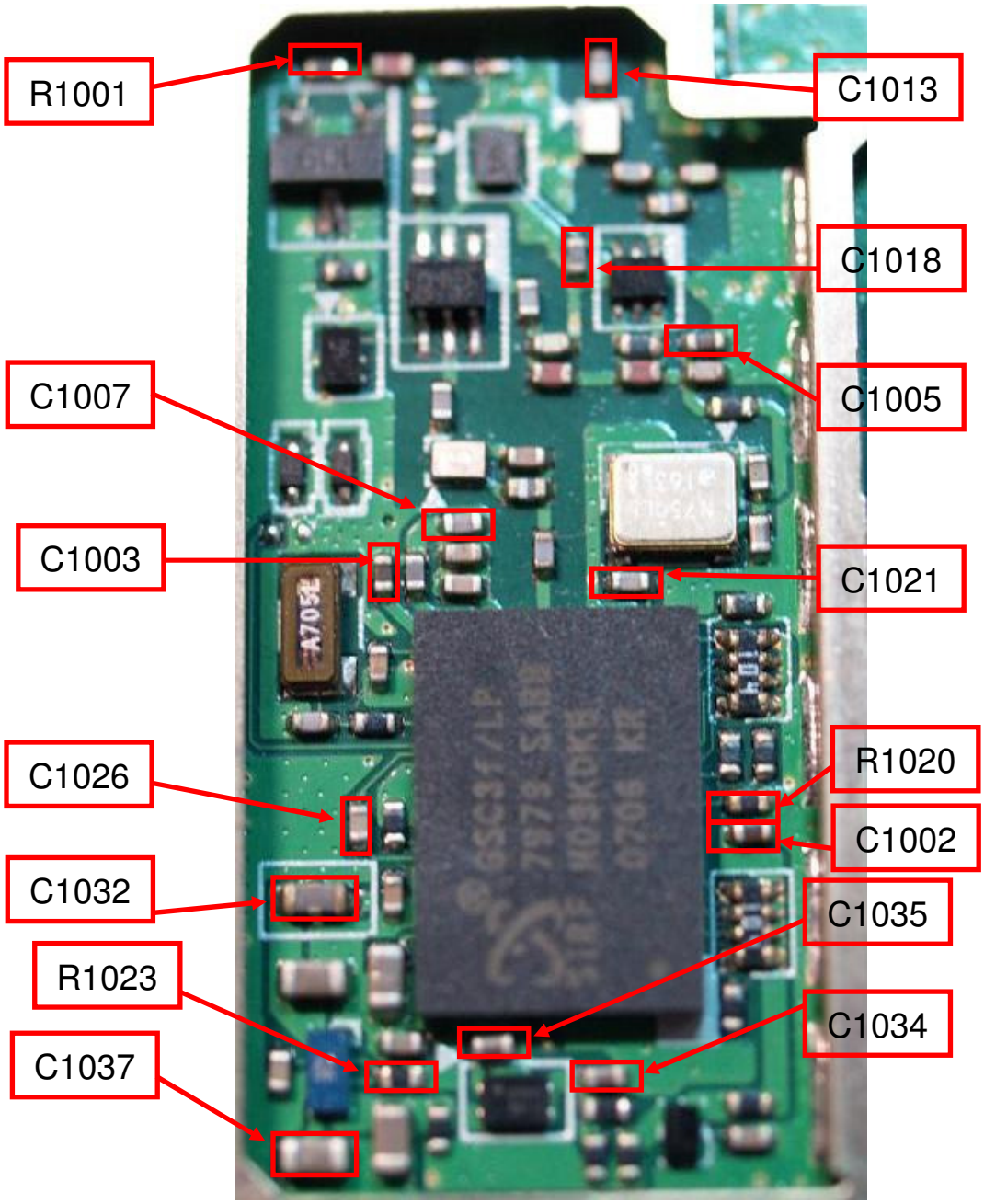


17. Test point plot

17.1 GPS Antenna



17.2 GPS Function Block



18. GPS Debug Procedure

The GPS examination procedure includes six parts. In the six parts, SiRFDemo PPC program must be used. (Appendix A)

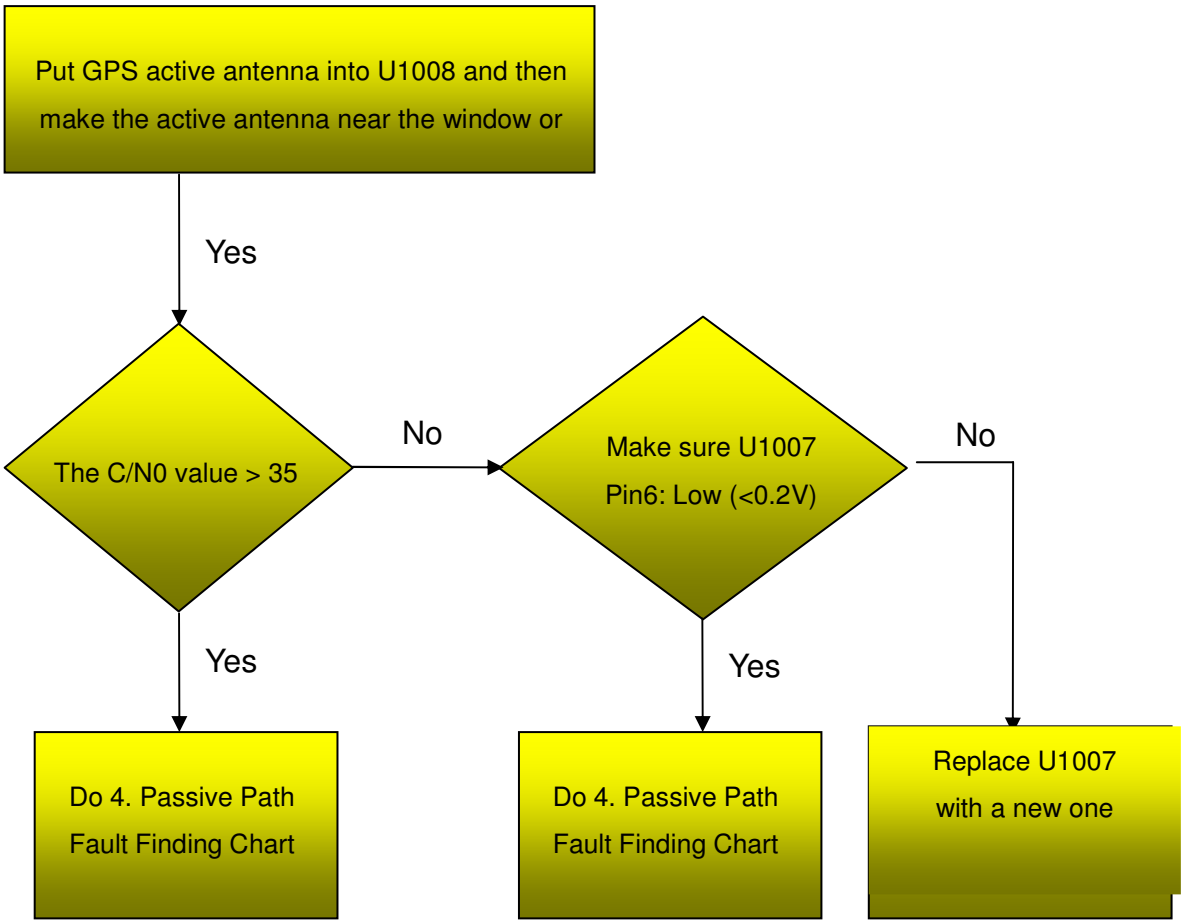
18.1 Start the SiRFDemoPPC program.

Then, make sure that the GPS comport setting is [Port:COM1][Baud Rate:4800 or 57600]. After this step, check whether the GPS function works or not.

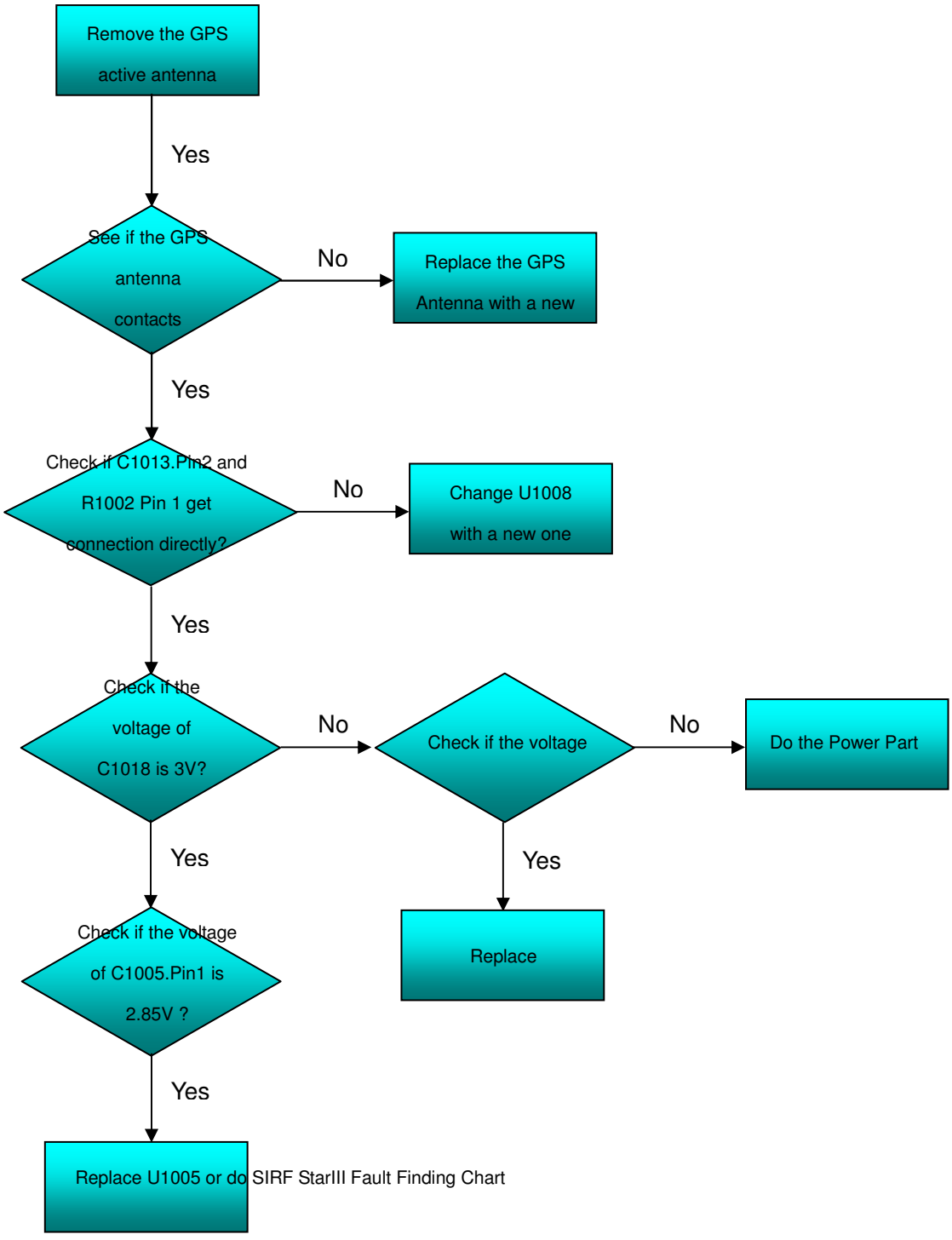
18.2 Check GPS functions

Re-download the GPS firmware (as Appendix B) and then check if the GPS function or works or not.

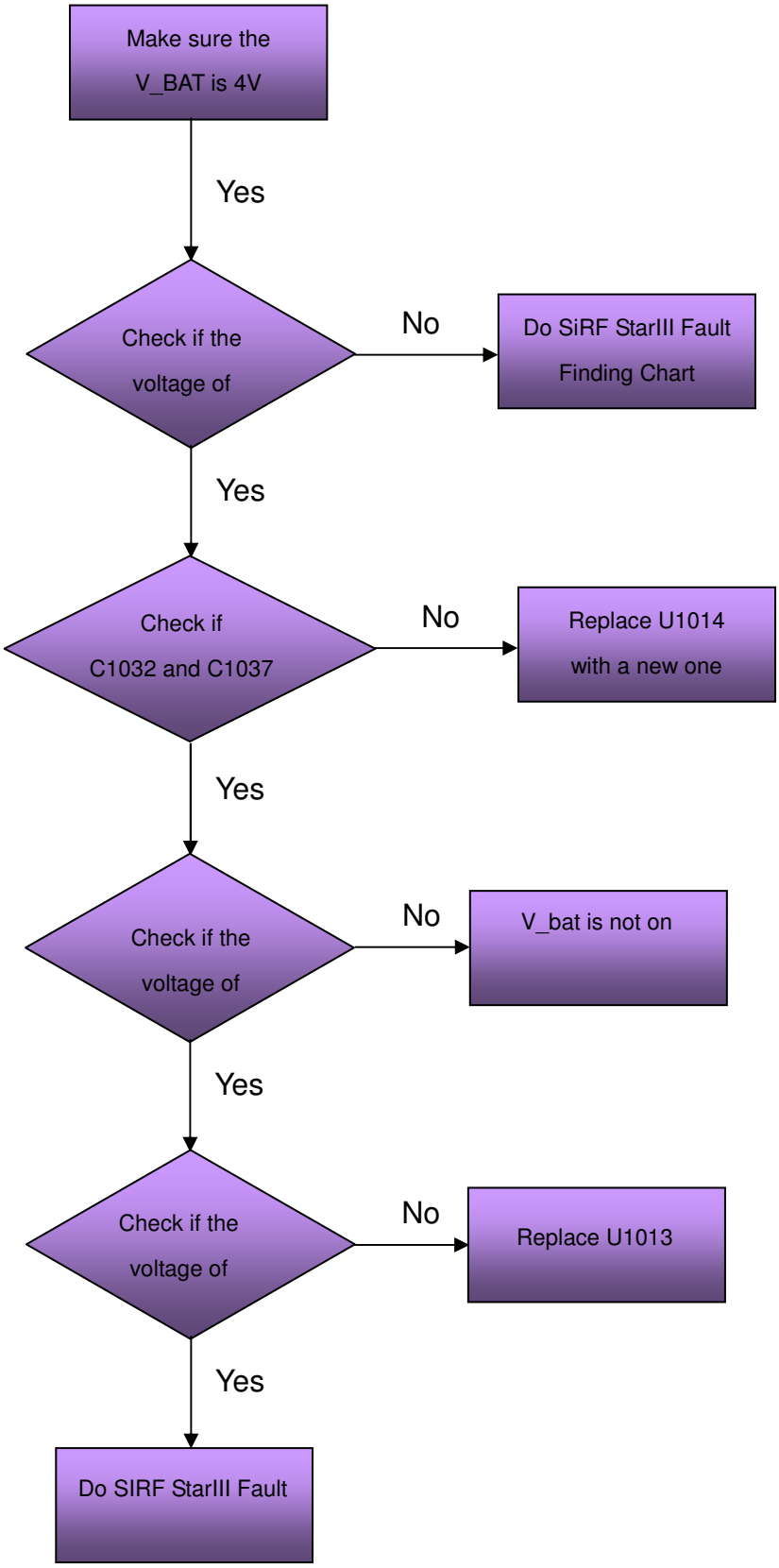
18.3 Active Path Fault Finding Chart


Put GPS active antenna into U1008 and then make the active antenna near the window or
Yes
The C/N0 value > 35
No
Make sure U1007 Pin6: Low (<0.2V)
No
Yes
Yes
Do 4. Passive Path Fault Finding Chart
Do 4. Passive Path Fault Finding Chart
Replace U1007 with a new one

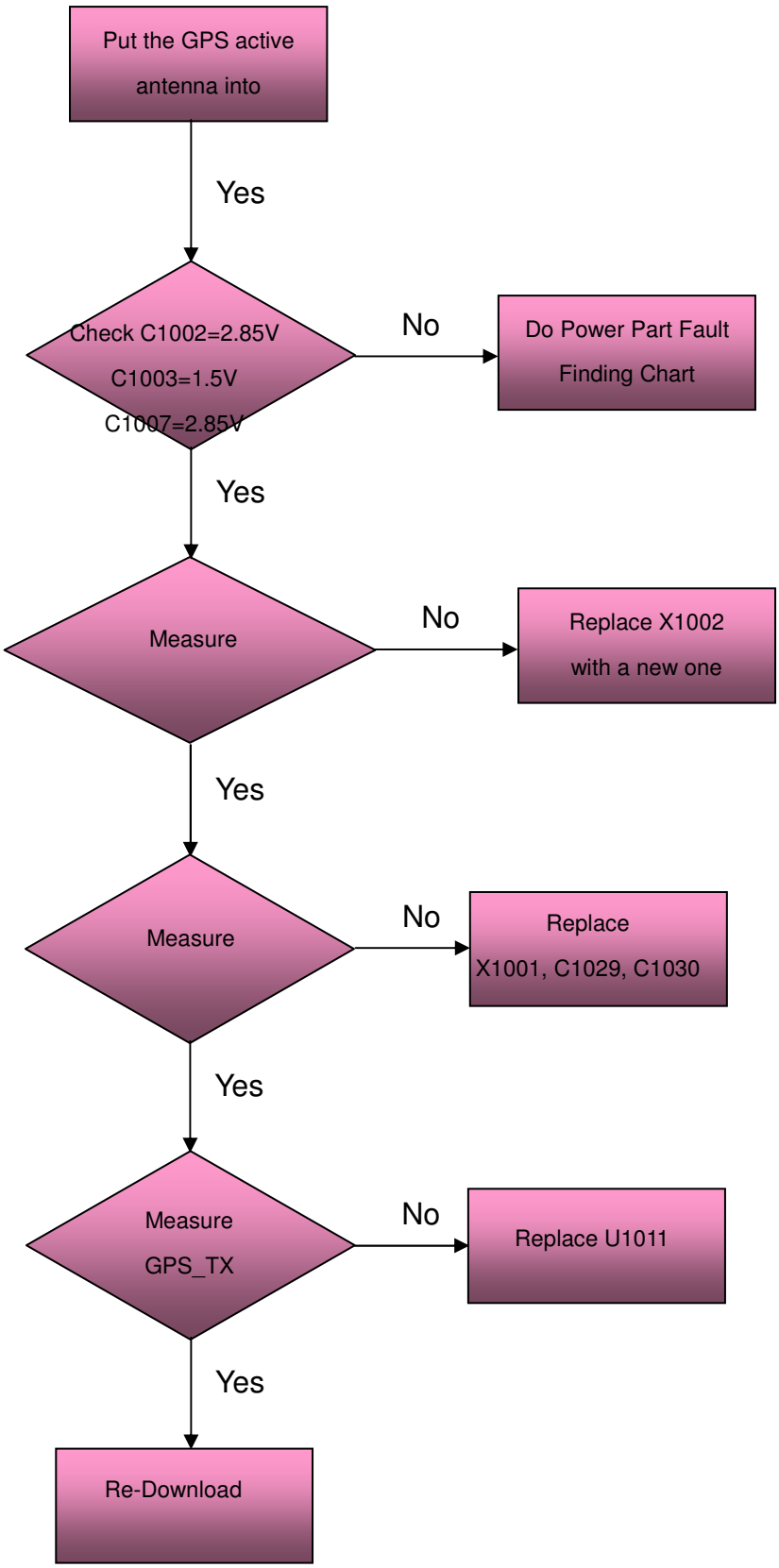
18.4 Passive Path Fault Finding Chart



18.5 Power Part Fault Finding Chart

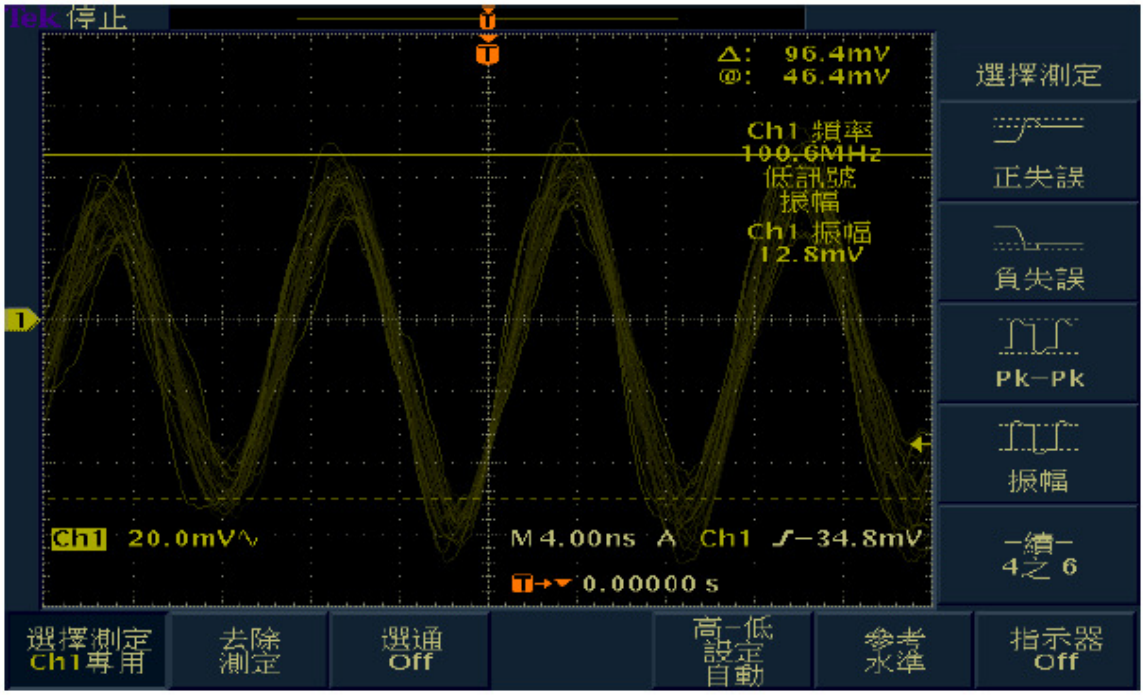


18.6 SiRF StarIII Fault Finding Chart

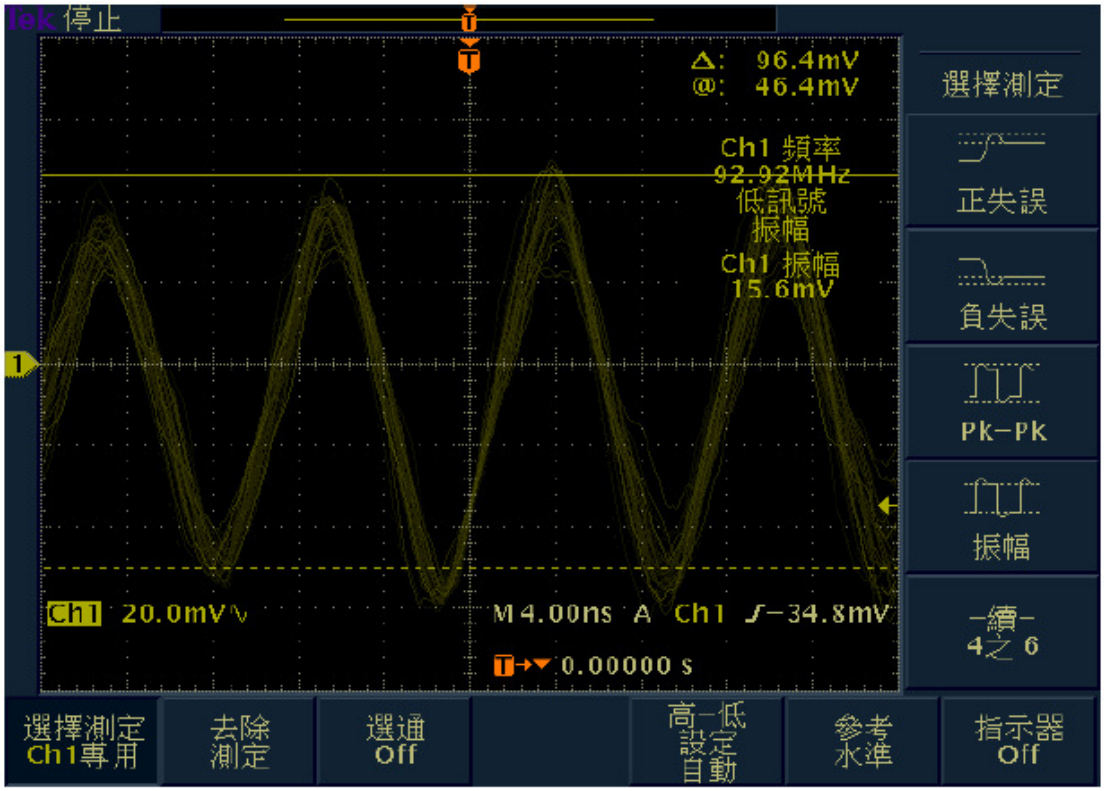


18.7 Measurement Result

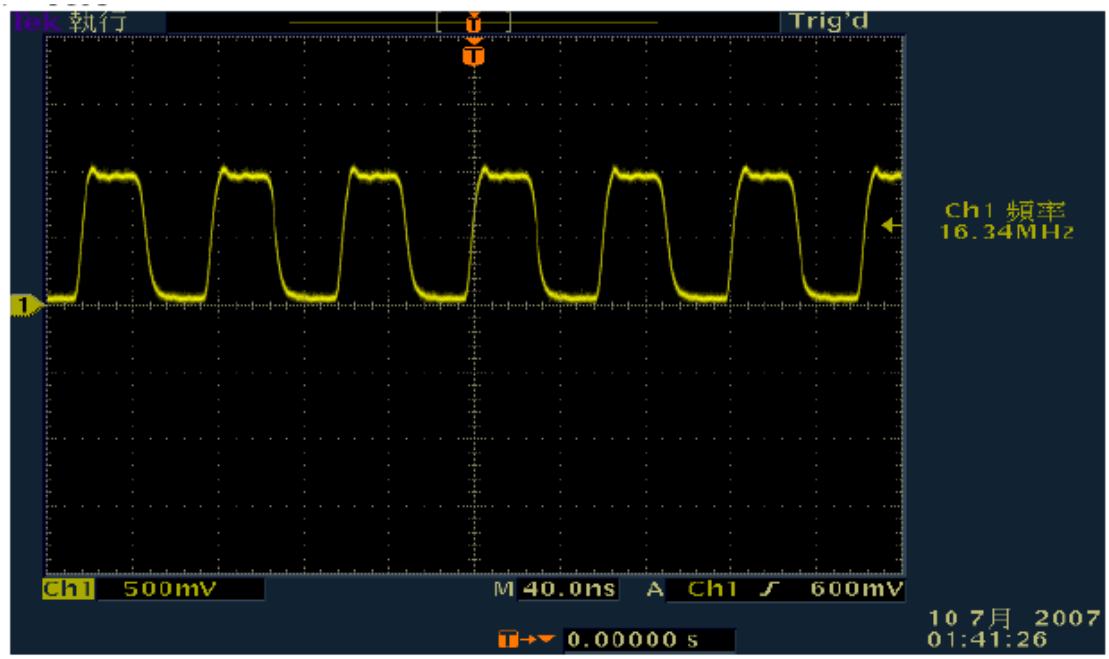
Test point：GPS_TX



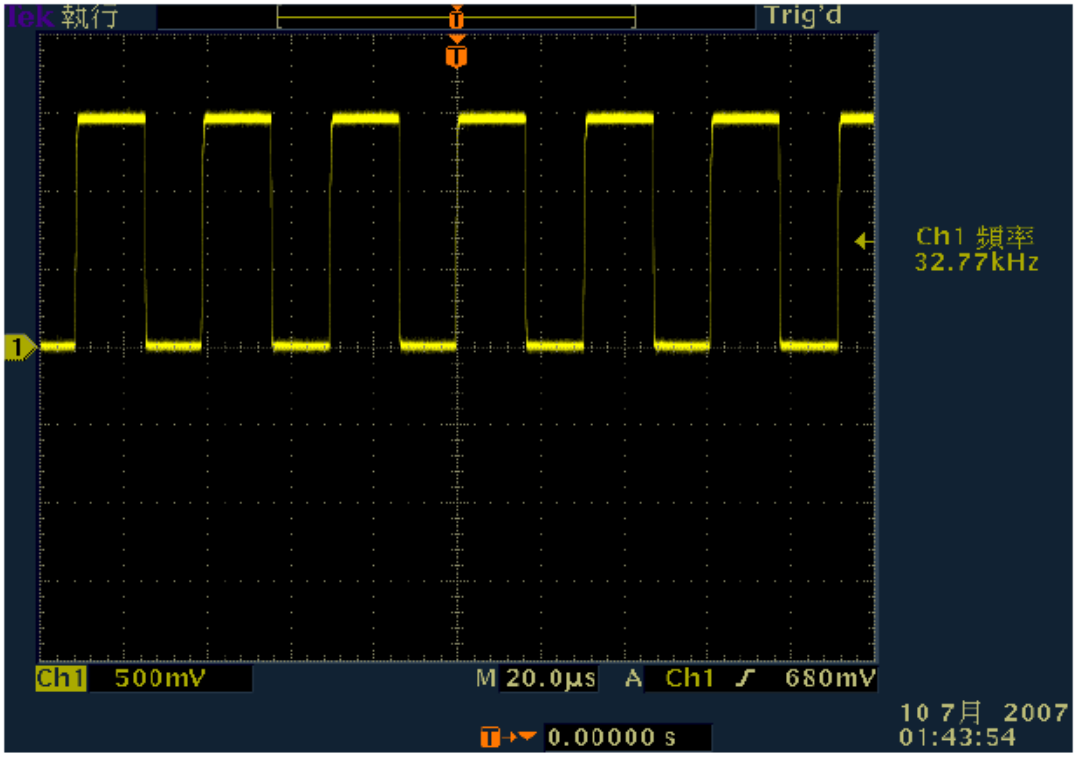
Test point：GPS_RX



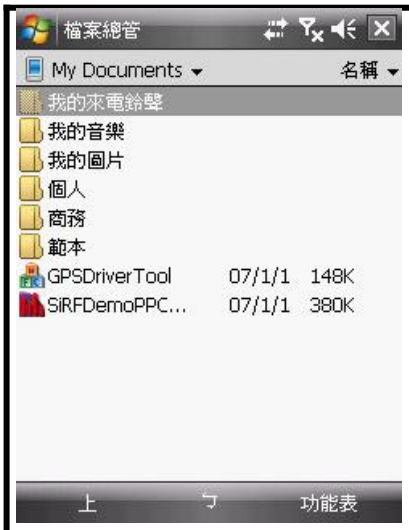
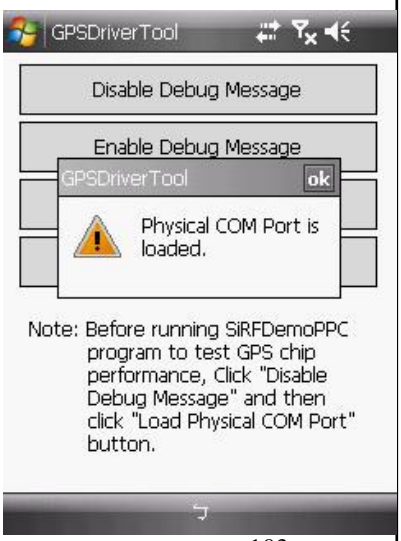
Test point：C1021

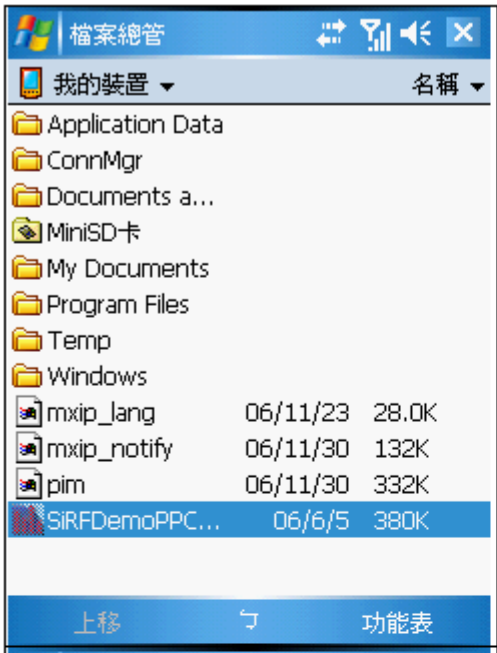
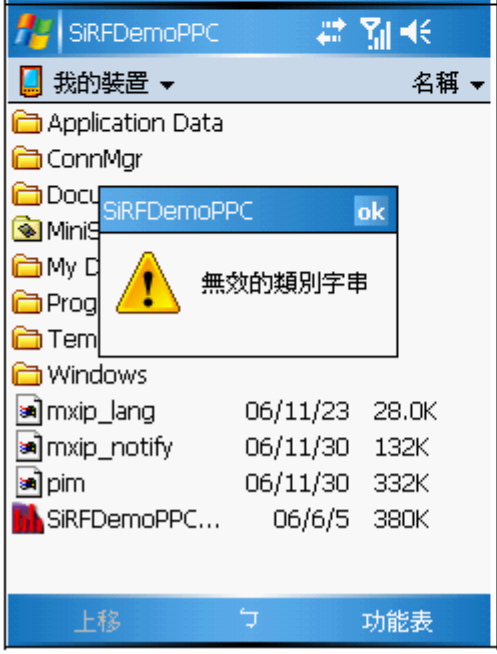


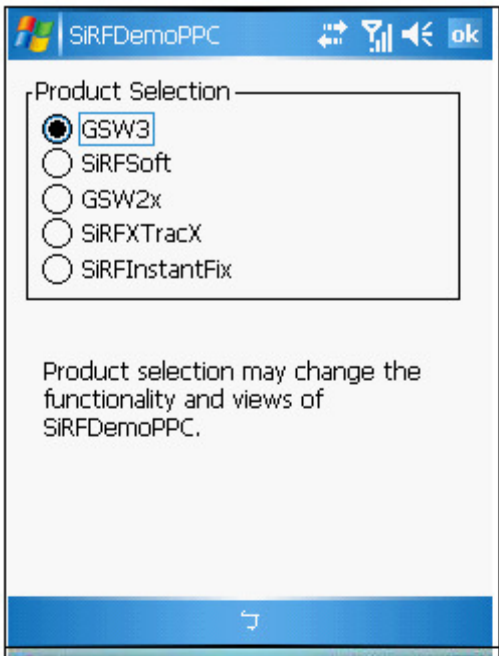
Test point：C1026



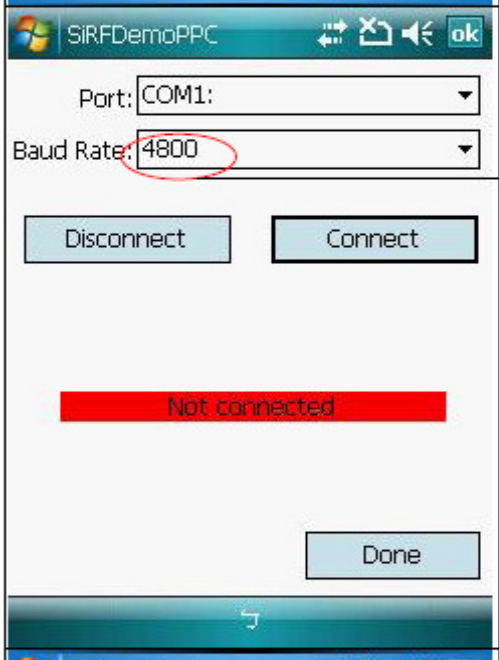
19. Software Procedure

	1. Put [GPSDriverTool] and [SiRFDemoPPC] at the SD card
	1. Execute [GPSDriverTool] and select [Disable Debug Message] 2. Select [ok] at the pop-up window
	1. After disabled debug message, select [Load Physical COM Port] 2. Select [ok] at the pop-up window 3. Select [ok] to exit the

	Put SIRFDemoPPC at Micro SD Card
	1. choose [SiRFDemoPPC] 2. choose [OK]

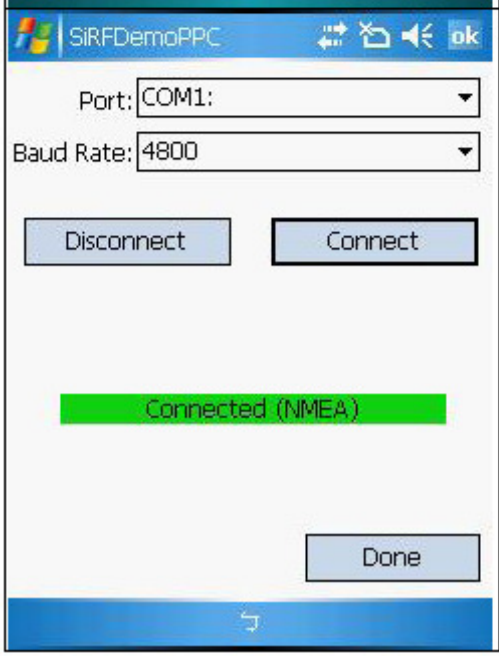


1. choose [OK]

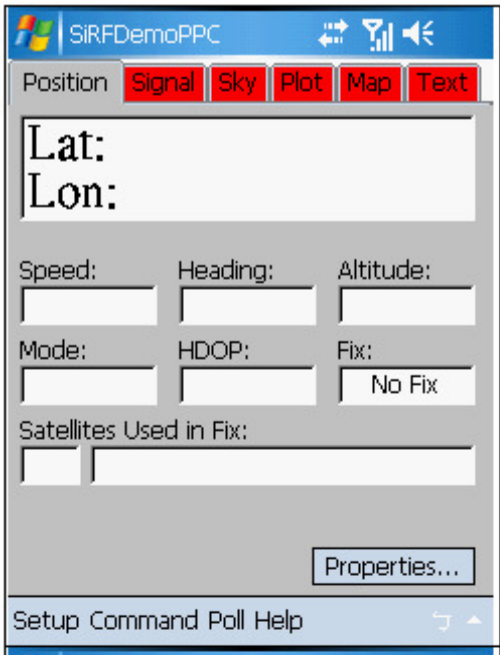
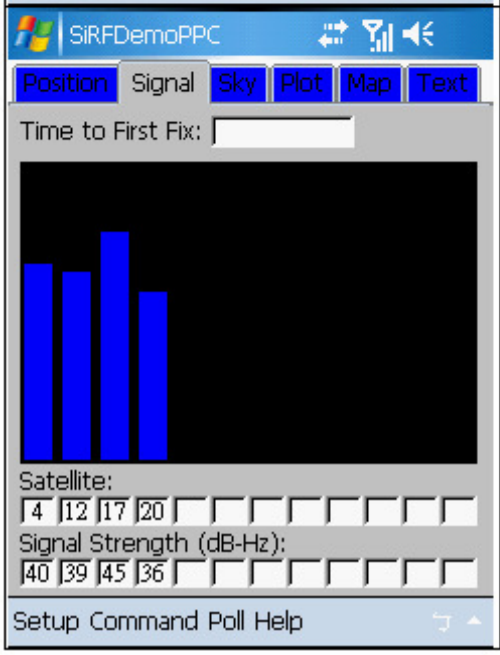


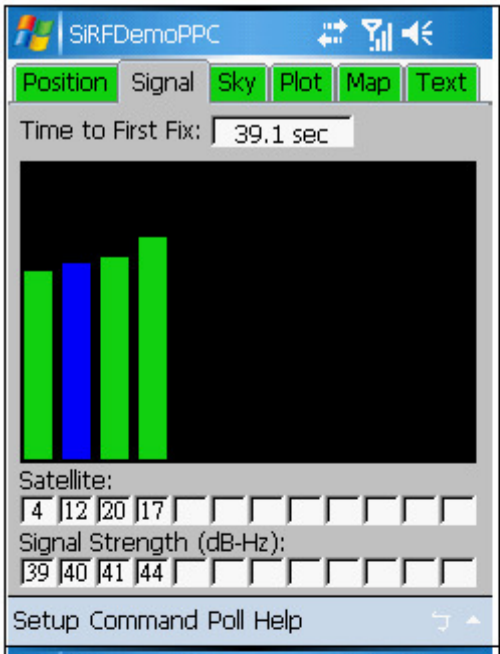
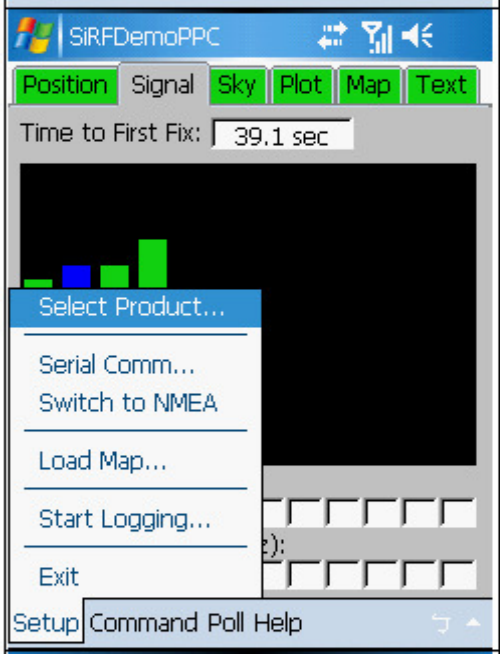
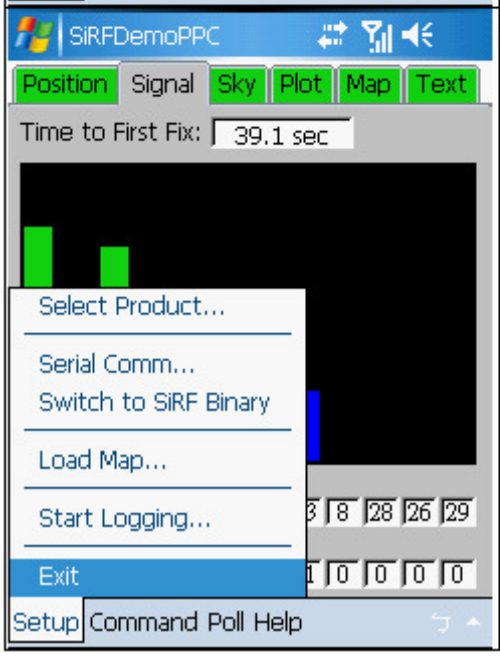
1. choose [Connect]

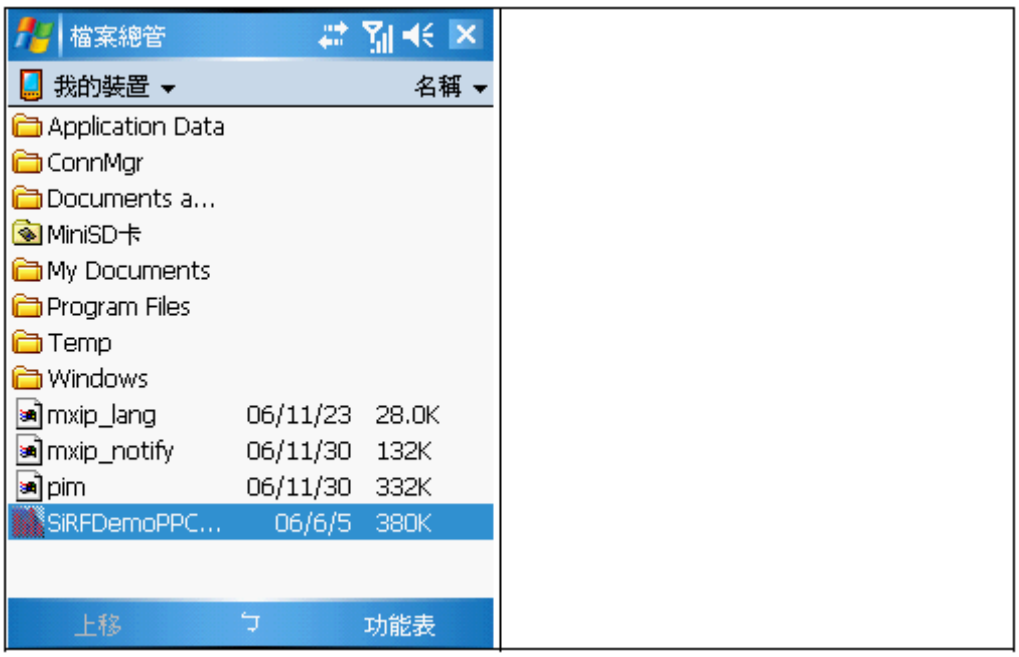
4800 or 57600



1. choose [Done]

	SiRFDemoPPC plantface
	1.choose [Signal]
	GPS signal receiving

	The green signal means the signal has been demodulated.
	When all tests are finished 1. choose [setup]
	1. choose [Exit]


檔案總管
我的裝置
名稱
Application Data
ConnMgr
Documents a...
MiniSD卡
My Documents
Program Files
Temp
Windows
mxip_lang 06/11/23 28.0K
mxip_notify 06/11/30 132K
pim 06/11/30 332K
SiRFDemoPPC... 06/6/5 380K
上移
功能表